THE

physical therapy

REVIEW

Volume 35 - Number 8 August 1955

What is Kinesiology? A Historical Review — HIRT

A Harness for Use in Progressive Resistance Exercise — SADOWSKY

Physiotherapy in Cerebral Palsy Today — LEVITT

Use of Tetanizing Current for Spasticity — VOGEL and WEINSTEIN

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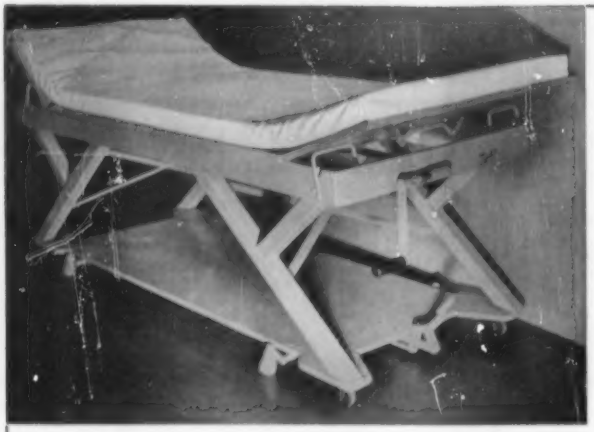

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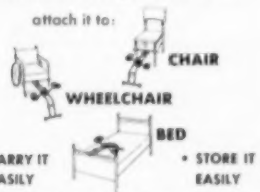

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The Physical Therapy Review

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Vol. 35 August 1955 Number 8

What Is Kinesiology?

A Historical Review

Susanne Hirt, B.S.

The "Institute on the Correlation of Basic Sciences with Kinesiology," held at the Continuation Center of the University of Iowa, was a historical event in the development of our profession. Only on rare occasions in the past have a group of teachers of our profession come together to discuss in detail the quality and quantity of teaching in a specific subject area. The life center of any profession is its schools and the major burden of responsibility for establishing and maintaining high standards of service rests with its teachers. Our schools have grown in number and capacity to a degree that systematic reevaluation of our standard curriculum has become a professional obligation. Not only the growth of our own profession obligates us to reevaluate our objectives, but growing and rapidly changing concepts of medical and social thinking and practices force this obligation on us.

We no longer represent a new profession primarily engaged in proving itself; we have become an important and recognized member of a team of professions working toward the common goal of medical, psychological, social, and vocational restoration of the disabled. This is the time for us to ask ourselves how useful are we? Do we become increasingly useful in the field that we claim as our specialty? And, do we show signs of growth as a specialty? We, as teachers, have perhaps been particularly aware and particularly proud of the untiring efforts and achievements of our administrative and professional leaders. But, also as teachers, we have our very special problems to solve. The occasion of this workshop may have been the beginning of an awareness for the need of forming a subspecialty within our profession, that of the teacher in physical therapy.

The choice of the topic for the first workshop was made by majority vote and may well be an indication of the significance of this topic within our total curriculum and thus within our professional work.

In an attempt to define the concept and the scope of the subject matter, it became clear from the beginning that a dictionary definition of kinesiology does not readily lend itself as an introduction to the analysis of the topic. Kinesiology is commonly defined as the "science of human motion." One is immediately tempted to raise the questions, "What constitutes a science?" and "Are we dealing with one science only?" We are dealing with the living human body, its structure, its function, and we are dealing with "motion," a concept defined by universal laws within the realm of physics. If we are willing to compromise, however, and accept the definition that "kinesiology is the scientific study of human motion," its origin can be traced to the beginning of scientific thinking and its history becomes part of the history of medicine.

The tracing of historical events is an essential and indispensable preparation for scientific investigation as well as for scientific teaching. We

Technical Director, School of Physical Therapy, Medical College of Virginia, Richmond, Virginia.

learn to see how sciences and scientific events develop and grow from one another and with one another. Both the investigator and the teacher will learn to see that the tools for investigation and the roots of a subject matter lie within intrinsic correlation between several different areas of scientific study. To prepare a logical and meaningful presentation of a subject matter we must recognize the roots and be willing to borrow the tools. To the teacher who is interested not only in the scientific but also in the dramatic aspects of his art, facts and textbook knowledge may become an expression of human genius, human struggle, and achievement.

The purpose of this brief survey of historical events, which are only samples of scientific investigation and investigators in the field of human motion, is primarily to create interest and perhaps to stimulate curiosity rather than to present a complete history of the topic.

On this journey through the past we will have only a quick look at five major periods. These are: I. Ancient Greece, II. The Renaissance period, III. the nineteenth century, IV. the first half of the twentieth century, and V. the present.

Ancient Greece

Scientific thinking, according to the historians, was first practiced by the ancient Greek philosophers and scientists. *Hippocrates (460–370* B.C.), the outstanding symbol of that period, freed the art of medicine from supernatural spirits and placed its responsibility squarely on man's shoulders. He, himself, reported only what he could perceive with his senses—see, hear, feel, or smell—without adding emotional or speculative interpretations to facts. When he drew conclusions, they were based on what he had perceived. When he was puzzled and could not comprehend, he very frankly said "I do not know." Hippocrates was primarily a bedside physician rather than a research scientist. But as a bedside physician he introduced the art of diagnosis based on living anatomy and physiology. As is well known, he also introduced the gentle, humane, and sincerely ethical approach into the art of healing.

The great research scientist of the Ancient Greek period was *Aristotle (384–322* B.C.) who was about 14 years old when Hippocrates died. Ancient Greek culture was at its height at this time, in all areas of human endeavors and particularly in regard to the investigation of the human mind and the human body. The Greeks' enthusiasm for athletics, sports, and gymnastics was part of their philosophy of developing the human being as a whole to optimal functional capacity. It took 2,000 years for this concept to be revived. Physical and mental gymnastics were practiced in the Greek gymnasium and were considered of equal importance to optimal development. The Greeks were aware of the fact that a healthy, happy mind more than likely develops in a healthy body. They utilized exercises for therapeutic purposes as well as for the sake of bodily development. Aristotle, the universal scientist, left his mark in practically every major science then known to man. Among these were: mechanics, physics, mathematics, chemistry, botany, zoology, physiology, and psychology. Among his many scientific works, he wrote a treatise on: "Parts of animals, movements of animals, and progression of animals." In it he said: "Athletes jump further if they have weights in their hands than if they have not; and runners run faster if they swing their arms, for in extension of the arms there is a kind of leaning upon the hands and wrists." In the same treatise he also describes the action of muscles and uses geometrical analysis. The act of "muscular flexion" he defined as a change from the straight line to an angle and noted that without this "flexion" there could not be forward progression, such as walking and swimming. This, for the first time, implies the thought of transformation of rotatory into translatory motion. It may entitle Aristotle to be called the "father of kinesiology." Aristotle also was the creator of the sciences of biology, embryology, and comparative anatomy.

Ancient Greek culture was at its decline towards the last century before Christ. Its last great representative or rather the last great representative of Greek medicine was *Claudius Galen (131–201* A.D.). Galen was among those who shifted the geographical center of attention from Athens to Rome. He brought Greek medicine to Rome, which explains the mixture of Greek and Latin in medical terminology. Galen was a rather eccentric but extremely colorful personality with a brilliant intellect. He was the greatest anatomist and physiologist of his time and a truly systematic scientist. Perhaps, partly due to his personality and only in part due to his genius, Galen's discoveries remained the final word in medicine for the next 1,300 years—one of the most astonishing facts of scientific history. Galen did a great deal of dissection, but only on the animal body—mainly the pig, the goat, and also the macaque ape. His description and analysis of the ape's hand leaves very little room for additions when compared with present day knowledge

of the human hand. Contrary to common belief, neither the abductor pollicis brevis nor the opponens pollicis are missing, nor very different in function from the human. The main difference is the location of the palmaris brevis. Galen saw two human skeletons, which were on exhibit in Alexandria. He, therefore, urged all those who intended to study osteology to make a trip to Alexandria. There was not a single human skeleton available in Rome in spite of the bloodthirsty practices of the Romans.

With the decline of Greek culture and the increasing influence of Roman culture, the high ideals related to physical development of the human body degenerated to showmanship. Professional athletes were looked down upon by the intellectualists as exhibitionists with a "lot of muscle and no brains." Athletics was no longer an educational process but had become merely a source of public amusement. "Spectatoritis" had become a public disease in Athens as well as in Rome. Selling physical performance was apparently not conducive to the scientific approach to the study of human motion. However, Galen's genius as well as thirst for knowledge made it possible for him to make very significant and permanent contributions to both osteology and myology. He was the first to relate physiology to human motion and wrote an essay on "The movements of the muscles." In it he spoke of agonists and antagonists, in regard to active contraction and passive lengthening. He referred to "tonus" when describing the muscular action needed for the maintenance of a position. He introduced the terms diarthrosis and synarthrosis and created most of the terminology used today in arthrology. Galen was the first anatomist who investigated the function of the diaphragm in the living animal by vivisection. He described its isolated action correctly, a knowledge which was forgotten and rediscovered by experimentation only 100 years ago by Duchenne. In spite of Galen's genius there was a significant difference in his approach to science from that of the Hippocratic approach. Hippocrates was a "modern" scientist in the sense that he acknowledged limitations and left the unknown for future generations to study. Galen had set himself up as the final and complete authority. He did not question his own statements nor would he allow anyone else to do so.

With the onset of Christianity as a philosophy of life, interest in the human body declined and eventually fell into complete disregard. No outstanding scientific discoveries were made in the field of medicine until the beginning of the Renaissance period. During the Middle Ages Galen's work was the medical "bible" in Europe. The authoritative influence of the church was reflected in the acceptance of book knowledge as the final unquestionable source in science. The study of anatomy during the Middle Ages consisted primarily of studying and translating Galen's work, a task which was mainly the responsibility of the monasteries. Ancient Greek science and thinking, however, were preserved for future generations by the Arabians who were the true scientists of the dark Middle Ages. They translated Greek manuscripts into their own language and, eventually, when Greek science was brought back to Europe, it was in Arabic disguise and had to be translated by Christian scholars from the Arabic translations of the Greek into Latin.

The Renaissance

Gradually the Middle Ages awakened from their "scientific sleep" which was noticeable in statements like the one made by an otherwise little known French physician who proclaimed—"God could not possibly have exhausted all his creative power in making Galen." This marked the beginning of recovery from the authoritative influence on science.

The little known French physician was right in his prediction when the most brilliant of all scientists and perhaps of all human beings appeared on the scene during the early Renaissance period. His name was *Leonardo Da Vinci (1452–1519)*.

The Renaissance brought an awakening not only of science but also of art. Some of the great Renaissance artists—Michelangelo, Raphael and Durer among them—began to study the human body very closely. They realized the need for having an accurate knowledge of the human skeleton and the musculature; and, therefore, began to dissect the human body. The human cadaver was still difficult to obtain at that time and frequently the artist was forced to play the role of a "grave-snatcher." Also, cadavers were not embalmed at that time. Some of these artists developed an interest in the human body which went far beyond the need for artistic representation. Among these was Leonardo Da Vinci. According to historians, Leonardo was the greatest artist, the greatest engineer, and the greatest biologist of his time. Robinson, in his "Story of Medicine" says apologetically: "These superlatives undoubtedly sound uncritical to a modern ear, but how else can we describe Leonardo

Da Vinci?" He continues: "We know no other individual who was both a creative artist and experimental scientist of the first rank. We must pronounce him the most versatile and intellectually fertile of all the sons of men." Leonardo Da Vinci was the first "modern" dissector of the human body. He, himself, dissected hundreds of bodies purely for the purpose of acquiring knowledge. He was the first one to draw accurate pictures of his dissections and he utilized dissection and demonstration for teaching purposes. Leonardo Da Vinci created the spirit of "modern" science with these words: "I do not understand how to quote from learned authorities, but it is a much greater and more estimable matter to rely on experience. They scorn me who am a discoverer; yet how much more do they deserve censure who have never found out anything, but only recite and blazen forth other people's works. Those who study only old authors and not the works of nature are stepsons, not sons of nature, who is mother of all good authors."

To his prospective pupils he had this to say:

"O searcher of this our machine, you must not regret that you impart knowledge through the death of a fellow creature; but rejoice that our Creator has bound the understanding to so perfect an instrument . . . And if you have love for such things you may be prevented by nausea; And if this does not hinder you, you may be prevented by fear of living during the night hours in the company of these quartered and flayed corpses, hideous to look at; And if this does not deter you, perhaps you lack the good art of draughtsmanship, which is essential for such demonstrations; And if you have the art of drawing, it may not be accompanied by the sense of perspective; And even if it is, you may lack the order of geometrical demonstrations, and the method for calculating the forces and strength of the muscles; Or perhaps you lack patience, so that you will not be painstaking . . ." And Leonardo Da Vinci concludes: "As to whether all these things have been in me or no, the hundred and twenty books written by me will furnish sentence, yes or no, for in these I have not been hampered by avarice, or by negligence, but only by time."

As is well known, Leonardo Da Vinci's genius was capable not only of drawing the living human body in motion but also the semidissected body, showing the actions and relationships of muscles as they are caught momentarily during a dynamic act of motion. This art unfortunately has never been continued since.

Leonardo Da Vinci's scientific works remained in manuscript form and were hidden from the world until quite recently. He planned to write a text on anatomy but this was never accomplished.

The task of writing the first scientific textbook on anatomy, based wholly on dissection was left to the man who is considered for this task the founder of "modern anatomy," *Andreas Vesalius (1514–1564)*. It is very likely that Vesalius never saw Leonardo Da Vinci's drawings, but the spirit of the time is evident in his work. His famous book, *The Fabric of the Human Body*, contains an abundance of plates which picture in the true spirit of the Renaissance the anatomy of the living, as Leonardo Da Vinci had seen it. He pictures muscles in a state of contraction and almost invariably suggests movement and activity, even expression. Basically, Vesalius's anatomy was complete, and only relatively minor corrections and additions have been made since. It is interesting to note that interest in human anatomy was expressed originally almost purely in terms of the living body. Then anatomy became a descriptive science which investigated and recorded the most minute structural details without relating them to their functional significance and eventually, mainly during our own century, anatomists returned to the interpretation of the living human body.

Rapid progress was made in many sciences during the Renaissance period, among these were physics and mathematics.

Galileo (1564–1642), the famous astronomer and mathematician, deserves mention here because he was the first one to give mathematical expression to mechanical events. Whether one feels a personal sense of gratitude to Galileo for this discovery or not, without this important scientific step, kinesiology would not exist.

Galileo's genius intrigued many scientists of his time and among these was one who deserves a special place in our historical survey. He was an Italian physician by the name of *Giovanni Borelli (1608–1679)*. Borelli utilized Galileo's formulas to give mathematical meaning to the events of the animal body. To his contemporaries he was known as the "medicomathematician." Charles Singer, in *A Short History of Medicine*, states: "that department of physiology which deals with muscular movements and with mechanical principles was effectively founded, and largely developed by Borelli." According to Arthur Steindler, Borelli may be considered the "father of modern biomechanics." Steindler also states that: "the essential feature of kinesiology is that it treats all motor functions, normal and abnormal as mechanical events." If we accept

this definition, then Borelli may also be considered "father of modern kinesiology." Borelli wrote on the mechanics of muscle action, on equilibrium and the center of gravity, on the relation of muscle force to the angle of application and the relation of the moments of rotation to actual lever arms in the animal body. By stating that "falling forward is prevented by the extensor muscles, while the flexor muscles are at rest," Borelli foretold Sherrington's law of reciprocal action.

The next important discovery of major significance for our subject matter was made by *Luigi Galvani (1737–1798)*, who observed that muscles contract when in contact with certain metals. This discovery made Galvani the founder of electrophysiology and made it possible for the great Swiss physiologist *Albrecht von Haller (1708–1777)* to develop the doctrine of irritability and excitability of muscle tissue.

NINETEENTH CENTURY

With the beginning of the nineteenth century we approach modern times with their characteristic symbol of *specialization*. By now, the ground work was laid in most basic sciences—physics, mathematics, biology, and even medicine. The most important events from now on are based on more and more detailed investigations in smaller and smaller areas. Whether by genius, or by accident, some of the apparently most minute discoveries led to the most far reaching developments within the sciences and revolutionized medical concepts and the mode of living.

The amazingly productive nineteenth century brought with it developments in three areas of major interest to us: biomechanics, electrophysiology and physical education.

During the latter half of the eighteenth century the geographical focus changes from Italy to France and Germany. The eighteenth century had introduced to the world a new philosophy of life and a new concept of the human being expressed in philosophy, art, and literature. *Jean Jacques Rousseau (1712–1778)*, the great French proponent of the period of enlightenment, had made his plea for "return to nature" which was followed by a revival of interest in the long forgotten beneficial effects of physical exercise. Rousseau also objected to the concept of a child as an "adult in miniature form."

The man who is credited by historians with having created the term "orthopaedics" (straight child), *Nicholas Andry (1658–1742)*, is said to have been one of the first who fully grasped the role of the muscles as body builders. He used exercise and good posture training as a prophylactic as well as a curative measure. Andry recognized that both rest and activity had therapeutic value, but that frequently rest was stressed too much where activity would have been more effective. Among interesting observations made by Andry are these: "Crookedness of the spine does not always proceed from a fault in the spine itself, but is sometimes owing to muscles of the fore-part of the body being too short, whereby the spine is rendered crooked, just as a bow is made more crooked by tying its cord tighter." Also, "The tendon which goes from the calf of the leg to the heel is sometimes so short that the person is obliged to walk upon the fore-part of his foot, without being able to set the heel to the ground. Children are sometimes born with this defect, and sometimes they come by it afterwards. In either case it may be cured, provided the shortness does not proceed from any violent cause which has absolutely maimed the tendon, such as burning after birth, or any other accident after birth that is capable of rendering this shortness incurable." Andry thoughtfully reminded his contemporaries that "as a child grows, his clothes must be made larger. . . ."

Rousseau's philosophy and the gradual development of concern over the specific medical needs of the growing child were probably contributing factors in the pioneering work of *Henry Ling (1776–1839)*, the great Swedish physical educator. Ling was the first to introduce anatomy and physiology into the field of physical education and succeeded in introducing physical education into the public school system of his country in 1801.

Of similar influence in Germany was *Frederick Jahn (1776–1850)*, the "German father of gymnastics." Physical education was introduced into the German public school system by Jahn in 1842. The turn of the century brought both Swedish and German methods of physical education into the public school system of this country. W. P. Bowen wrote the first text for physical education teachers, *Scientific Physical Education* in 1919.

The field of biomechanics received its most important contributions from German investigators. It is likely that some of the interest was stimulated through the growing enthusiasm with which physical education was received in Germany. Among the outstanding investigators are the *Weber Brothers (1795–1875)*, who collaborated on extensive studies of the dynamic

action of muscles and the mechanics of locomotion. A generation later Braune and Fischer published their classical studies on locomotion and the center of gravity. They created the term "normal posture," a military position in which the weight line intersected the base of support at a point perpendicular to the center of the ankle joint. Strasser and Rudolph Fick, authors of the classical textbook, *Muscle and Joint Mechanics*, made detailed mathematical analyses of joint movements. One other outstanding German anatomist, S. Mollier, the author of *Plastische Anatomie* (1926), may well be considered one of the most distinguished teachers in living anatomy.

In the field of electrophysiology, the most noted investigators are found mainly in France and England. Among them are the names of Emil DuBois-Raymond and C. S. Sherrington. There is one physiologist whose name stands out for his specific contribution in the field of the scientific study of motion on the living human body. His name is *Guillaume Benjamin Duchenne (1806–1875)*. Duchenne studied medicine in Paris, where it was said he exhibited no particular interests or abilities. In 1835 Duchenne became interested in the application of faradic current in the treatment of various diseases. Up to this time the electromagnetic induction current, which was discovered by *Michael Faraday (1791–1867)*, was applied by means of platinum needles inserted into the tissues. This was a painful procedure and often resulted in necrosis. Duchenne found that it was not necessary to puncture the skin in order to stimulate muscles; that application of electrodes to the skin was sufficient. Soon he realized the vast possibilities of this method in diagnosis and treatment.

Duchenne's classical work is the *Physiology of Movements* in which he describes the action of practically every important superficial muscle of the human body as determined by electrical stimulation and observation on hundreds of normal and abnormal persons. Steindler writes: "Duchenne determined the action of muscles with great accuracy and clinical skill, and contributed innumerable clinical observations on pathological conditions involving muscle function. His works are a real treasure chest of information on muscle mechanics. Among the conditions which Duchenne identified and described were locomotor ataxia in tabes, and progressive muscular dystrophy. It was these latter patients who served as his most interesting "experimental" subjects. Duchenne was the first to utilize abnormal muscle function for the study and analysis of normal muscular function. Duchenne states in his book, *Physiology of Movements* (1866), "Clinical observation helped me to understand the mechanism of some of the obscure phenomena which were observed during the electrophysiologic experiments. Clinical observation taught me that taken as a guide in my electrophysiological investigations, it would inevitably reveal the precise mechanism of muscular function which always requires a combined contraction of a large number of muscles." "It is known that the normal position of rest of the extremities depends almost exclusively on the tonic forces of the muscles which are responsible for motion of the extremities. One can picture the muscles which surround a joint as so many springs, which act to maintain the extremity in its normal position during muscular rest. If one of these springs becomes weaker, the balance of the tonic forces is broken and the extremity is pulled continuously by the remaining springs in an abnormal direction. This results in deformities which gradually increase and cause articular and osseous changes." "Knowledge of the muscular mechanism leads to a rational treatment of paralysis, atrophies and deformities, by application of special local peripheral stimulation, physical exercise and physiologic prosthesis."

Selections from the clinical works of Duchenne were translated and published in 1883 by the Sydenham Society in England, but none of the selections were from the *Physiology of Movements*. The translators stated that this was so great a work that it was hoped it might be translated in its entirety for the benefit of the English speaking world. The book was translated into German in 1885. The first translation into English was not made until 1949 by Dr. Emanuel B. Kaplan, Orthopedic Surgeon, Hospital for Joint Diseases at Columbia University, New York. In his foreword Dr. Kaplan states:

"The surprising absence of translation was probably due to several factors, one of which was the state of medical thought of the period. It was not quite ready for Duchenne's abundant new findings and ideas. The action of individual muscles and groups of muscles was of relatively little importance. The neurologists were interested in the all embracing clinical entities; the surgeons did not develop effective operative treatment for the loss of muscles, tendon injury, or peripheral nerve destruction. Surgery of the locomotor system was in its infancy. The anatomists of the period were preoccupied mostly with morphology and gave comparatively less thought to correlated physiology."

"However," Dr. Kaplan continues, "this book may be placed among the greatest books of all times—not on account of its historical significance—but because it contains an excellent record of the kinesiology of the entire muscular system, with very few exceptions, investigated by one observer whose genius, perseverance and originality permitted him a deeper insight into the action of muscles than given to many of his predecessors and perhaps more modern investigators in this field."

Since we are dealing here with history, and since it has been customary for historians to bestow great men with the title of father of . . . this reporting historian would like to suggest that Duchenne be given the honorary title of "father of modern physical therapy."

TWENTIETH CENTURY

We are now ready to approach our present century and thus, are stepping out of history. One of the leading personalities in the scientific study of human motion is Dr. Arthur Steindler. His well known text on *Mechanics of Normal and Pathological Locomotion in Man* embraces far more material than the title indicates. The text was first published in 1935 and is a revised presentation of lectures given to students in orthopedic surgery and physical education. Steindler states in his foreword: "There are excellent treatises which deal abstractly with some phases of locomotion from the physical and mathematical point of view. Their very abstractness makes them a rather difficult study to the nonmathematical mind. And more than that—the reader often fails to find the link between theory and practical application for his own clinical or educational needs. The reader wants to be shown in unequivocal manner to what theory leads and what it signifies for the practical side of the professional situation."

With a historian's point of view in mind, we can recognize in this statement a significant attitude, characteristic of our present time. Progress in all scientific areas is more rapid than it ever has been before. Even though basic research is always steps ahead of practical application, these steps tend to become fewer, or, the practitioners tend to become increasingly impatient, a trend which has created the need for more rapid and complete interpretation of highly abstract findings into the language of the professional worker.

This has been quite evident in the study of human motion. Excellent examples for instance are the now almost classical studies published by Inman, Abbot, Saunders, and Eberhart. The first major study was *Observations on the Function of the Shoulder Joint* published in 1944; the more recent one is *Major Determinants in Normal and Pathological Gait* published in 1953.

This has been an attempt to trace the origin and the development of the scientific study of human motion. One cannot help but recognize that "Kinesiology" is a very broad, almost unlimited field. One can see that the contributions to this scientific area have come, and are coming from the biological as well as the physical sciences. The principal contributors are anatomy, biomechanics, physiology, basic and applied clinical science.

To present a logical and balanced correlation of these constituents within the scope of a college course is not an easy task. It may help, however, if one is reminded that "correlation" is a mental process and not a technic. A teacher can present, show, and explain, but the student must correlate in his own mind. Correlation is based on reasoning, a highly individualized process, which can be stimulated but not taught.

Our own specific field of interest—physical therapy—deals with phenomena which can be perceived in the living human body, and these phenomena are not all abstract in nature. We have an unusual opportunity for assisting the student in his search for meaningful integration and correlation. We can avail ourselves of all channels through which a specific motor event can be perceived, interpreted, and understood. Essentially these are: the mechanical aspects of the motor event, the afferent aspects—mainly proprioceptive—the efferent, or motor aspect proper, the intellectual aspect, and the psychological aspect.

These are merely the familiar avenues which we as physical therapists utilize in our daily work during the process of "motor teaching" and "motor learning." The teacher in physical therapy can assist the student in finding and understanding these avenues to a degree that eventually the correlation of kinesiology with the basic and applied sciences need not remain entirely an act of abstract thinking, but may become an intellectual as well as a very personal kinesthetic experience.

To the extent that this goal can be approached, we may well be on the road toward giving deeper meaning to our specialty and toward training therapists who may offer increasingly valuable service. (Bibliography follows on p. 426)

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Suggestions from the Field

A Harness for Use in Progressive Resistance Exercise

Howard Sadowsky, B.S.

In Poliomyelitis the patient with a paralysis of the lower extremities and paresis of the back and abdominal muscles requires extensive bracing to ambulate successfully. Such bracing is useless unless the patient has sufficient strength in the trunk musculature to manipulate the apparatus. This strength is usually acquired through a program of progressive resistance exercises involving the back extensors and abdominal muscle groups, among others. The program is facilitated if (the DeLorme) exercise apparatus is available. However, the harness in use at present has left much to be desired in the way of patient comfort, efficiency, and ease of operation. The harness described in this paper has demonstrated itself to be successful in overcoming the difficulties encountered.

In the course of administering the exercise program, patients complained of chafing and reported breathing restriction. It was noted that the harness had a riding-up movement while in use; that the leather straps chafed under the arms and on the shoulders; and that breathing was restricted during the work period. It was also desirable to reduce the time consumed in donning and removing the device. A new harness was then devised to overcome these difficulties.

All leatherwork is felt-padded. Integral shoulder straps have been introduced to prevent chafing and to distribute the load evenly. The chest-yoke and abdominal belt are of webbing to conform easily to body contour and are fastened with self-locking, friction type buckles for ease of operation and security. The abdominal belt is so placed that neither rib-cage action nor trunk motion is restricted. Both belts are fixed in position by rivets and reinforced with stitching, thus eliminating further slippage within the assembly itself.

A detachable perineal strap is provided to prevent the harness from riding up while in use. (Such motion occurs with patients of large stature and/or heavy loads.) It is rolled from soft leather and so attached to discourage binding and chafing. It is adjustable within limits to accommodate size ranges, as is the entire harness assembly.

Figures 1a and 1b. Supine exercise position, anterior view. (Clothing removed to permit best photographic view.)

Figure 1a. Note 1) axillary binding, 2) restricted chest expansion, 3) bar limiting complete range of motion.

Figure 1b. Showing absence of binding and chest restriction; bar in open. Note perineal strap and attachment.

Figures 2a and 2b. Supine exercise position, posterior view.

Figure 2a. Previous buckle arrangement.

Figure 2b. Showing 1) shoulder strap, 2) yoke and abdominal belt buckles, 3) length adjustment.

Physical Therapist, Lemon - Bowlus - Cather Medical Offices, Toledo, Ohio.

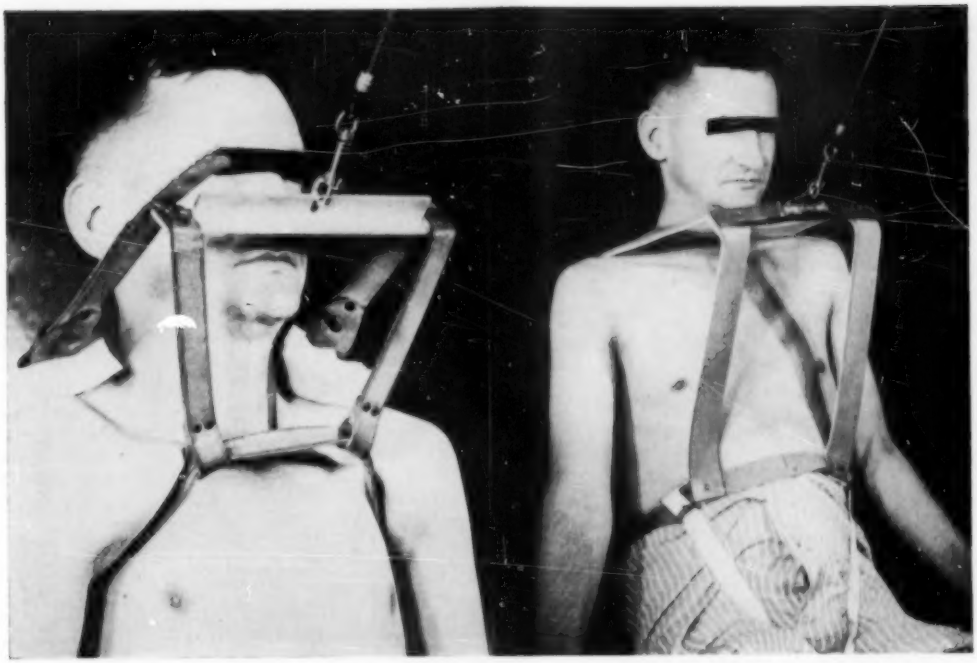

Figure 1a.

Figure 1b.

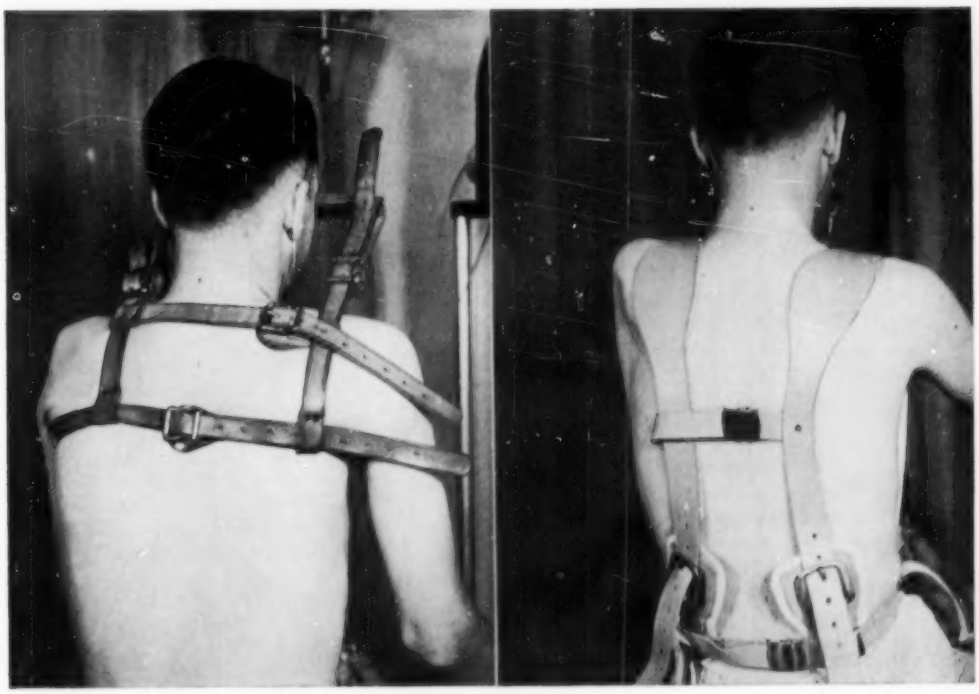

Figure 2a.

Figure 2b.

Figure 3a.

Figure 3b.

Figure 4a.

Figure 4b.

Figures 3a and 3b. Prone exercise position, anterior view.

Figure 3a. Note 1) axillary binding, 2) pads necessary for relief of shoulder binding, 3) tracheal pressure point.

Figure 3b. Showing freedom from binding and pressure points.

Figures 4a and 4b. Prone exercise position, posterior view.

Figure 4a. Previous arrangement. Note posterior axillary binding.

Figure 4b. Showing freedom from binding. Note cable attachment and bar, perineal strap positioning.

The aluminum bar for attaching the harness to the exercise unit may be cast in semicircular form; but a straight bar bent in an arc has been satisfactory. The bar is provided with a stainless steel mount to which is clipped the exercise cable. Steel was preferable to aluminum since the latter is subject to wear faster.

The device is equally effective in conditions other than poliomyelitis which require a like exercise program. It may be utilized in hospital departments, office treatment, and home exercise programs, by means of a simple pulley attachment or the regular exercise unit.

SUMMARY

Since the basis for a successful resistance exercise program depends upon the patient's ability to put forth the utmost effort throughout, patient comfort is essential. The apparatus described was devised to increase patient comfort and to enable the exercise to be performed more efficiently and with greater ease. To this end this apparatus has proven successful.

Grateful acknowledgment is made to Dr. N. H. Polmer, Medical Director, School of Physical Therapy, Charity Hospital of Louisiana at New Orleans; and Mr. Elwood Cantelli, New Orleans Orthotist.

Third Medical Conference of Muscular Dystrophy Associations

Muscular Dystrophy Associations of America, Inc., is distributing to physicians, researchers, medical publications and libraries the published proceedings of its Third Medical Conference held in New York City last October.

Attended by more than 400 doctors, scientists and laymen, the Conference was the largest seminar on muscular dystrophy ever held. The proceedings were published by the American Journal of Physical Medicine.

The Conference was seen, by Dr. Joseph C. Hinsey, Director of New York Hospital-Cornell Medical Center, as "an acceleration in the forward progress of this association . . . mainly in the field of research interest and in the number of people who are participating."

Comprising, as it did, six symposia dealing with basic biochemistry and physiology of muscle and the clinical aspects of the problem, it was noted at the Conference that "by bringing together scientific men with widely different backgrounds, to focus their attention on a common problem, much can be accomplished which, in the future, may prove to be of more value than the work of one individual in isolation."

American Medical Writers' Association

The 12th annual meeting, American Medical Writers' Association, will be held at the Hotel Jefferson, St. Louis, September 30, followed by an association sponsored Workshop on Medical Writing, October 1. Dr. Richard Hewitt, Associate Professor of Medical Writing, Mayo Foundation, University of Minnesota, will serve as Coordinator of the Workshop.

All physicians and college graduates interested in medical writing, journalism, or publishing are cordially invited to attend the meeting and to become Association members. There is no registration fee for attending the meeting, but nonmembers will pay a $5.00 registration fee for the Workshop. For details, write Harold Swanberg, M.D., Secretary, 209-224 W. C. U. Building, Quincy, Illinois.

American Occupational Therapy Association

The 38th annual Occupational Therapy convention will be held in San Francisco, California, October 25 to 28 at the Sheraton-Palace Hotel. Outstanding leaders in various medical and allied fields will present current trends and problems in the fields of orthopedics, neurology, and psychiatry as well as tuberculosis, geriatrics, and pediatrics.

Preceding the convention there will be a Workshop Institute (October 24 to 25) highlighting "The Patient's Point of View." A panel of speakers representing various social, medical, and educational fields will open the meeting, followed by discussion workshops.

Program and convention information may be obtained by writing to Northern California Occupational Therapy Association, 1680 Mission Street, San Francisco, California.

Physiotherapy in Cerebral Palsy Today*

Sophie Levitt, B. Sc. (Physiotherapy) Rand.

During 1953 and 1954, Miss Levitt traveled throughout the United States and England to observe varied programs in the treatment of cerebral palsy. The following material was presented in South Africa upon her return and contains her impressions of several centers in this country.

Physiotherapy is recognized as playing an essential role in present day rehabilitation programs for the physically handicapped. This is understandably so, in that certain important aspects of physiotherapy are intimately concerned with the study of motion, its distortions, and correction thereof.

In cerebral palsy the distortion of motion appears to be the most obvious problem, and thus physiotherapy has assumed eminence in the treatment of such cases. In fact it has often been stated that physiotherapy is the foundation of such a habilitation program.

Unfortunately this view is associated with the concept of cerebral palsy as merely a physical handicap, and the definition commonly used, is that "cerebral palsy is a condition characterized by paralysis, weakness, incoordination or any other aberration of motor function due to damage of the motor cortex of the brain." This definition apparently ignores various other factors of the condition. Today, the majority of therapists realize that beside motor handicap there may be all or some of the following disabilities: convulsions, hearing loss, visual disorders, speech difficulties, disturbances of perception (visual, auditory and others), interference with concept formation, and behavior problems. But these multiple difficulties are often regarded as isolated additions to a list of handicaps.

It seems to some workers, of which I am one, that such an outlook tends to lose sight of the child as a whole. This leads to treatment of just his physical handicap, or each handicap in isolation. The emphasis should be shifted from the specific defects, to the child. It is the cerebral palsy child that is fundamental to a habilitation program, not physiotherapy, nor any one therapy, nor education nor psychology. Instead all of these should be integrated into the habilitation program.

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* Read at the First National Conference on Cerebral Palsy in South Africa arranged by the Transvaal Association for the Care of Cerebral Palsy and the National Council for the Care of Cripples in South Africa, Johannesburg, September 1954.

It is worth noting that it is habilitation and not rehabilitation of these children for they are not acquiring capacities that were lost, but motor skills that are new to them. Without previous experience or training, the normal child inherits these motor skills of his ancestors and of his cultural environment. At certain ages, and in a fairly uniform sequence, he learns to focus and follow an object with his eyes, then to lift his head, and then to begin to use his arms and hands, and kick. He rolls over, balances his trunk, sits up and begins to crawl. He pulls himself up to a standing position and eventually walks. Through this very brief first 18 months of life, one sees how at this time, development depends a great deal on motor function. In association with this, there is much self-education. The child begins to see the world not only from lying on his back but from different positions and through movement. He reaches out into his environment, receives stimuli from it, and explores it. The exploratory activities are often rewarded by satisfying accomplishments and this encourages him to tackle more complex tasks.

The cerebral palsied child is characterized by a disturbance in development: he does not show the normal motor skills at the usual time and when they do appear they are defective. He is unable to acquire many experiences, for when he does attempt exploratory activities in the normal environment, he often meets with failure or parental anxiety and disapproval due to the possibility of accidents. It becomes so much easier if he remains unenterprising. However, if the child is intelligent, has spirit, and is fortunate in receiving the correct guidance from therapists, teachers and parents, he can accomplish a great deal.

Varied Programs

How does physiotherapy play its part in assisting the child in this way?

Today there are various schools of thought concerning this, as has been indicated to some extent in the introduction. There are many

different technics of therapy and the more familiar will be briefly outlined.

I have attempted a bird's eye view of the most recent thinking and technics by many cerebral palsy physiotherapists in the world today. There is not yet any scientific evidence of the most superior means of treatment, though all claim equally good results. Spencer has been quoted as saying that human opinion passes through three phases:

> "The unanimity of the ignorant,
> The disagreement of the inquiring and
> The unanimity of the wise."

There may not be one treatment about which all would agree unanimously. In any event, it would probably not be applicable to every cerebral palsied case. There may well be more than one path to the same destination.

All of the paths, however, take much time and patience to travel along. Much as we would like it, there is no pink pill to wipe out this distressing condition. Neither is there a "great cure overseas." If there were we would certainly know about it.

Cerebral palsy workers in South Africa as in other countries have the choice of on one hand following one of the established schools of thought and possibly developing their own applications of it. For example, in Britain some therapeutic approaches are based on Dr. Phelp's principles of treatment but modified according to the experience, views, and particular cases of the doctors and physiotherapists. It has been stressed, especially by Marguerite Abbott, New York City, that one must beware of subjecting a cerebral palsy child to a set technic but rather fit the technic to the needs of the child.

On the other hand, one could adapt from various methods according to one's evaluation of them and the individual child. One must remember though, that occasionally some methods may be so fundamentally different that they do not lend themselves to this. Berta Bobath feels that the treatment she employs is such that it cannot be given in association with any other.

Incidentally, I must draw attention to the fact that I have discussed cerebral palsy children. Strictly speaking, cerebral palsy encompasses adults as well, e.g. hemiplegia following a stroke and its resultant brain injury. There are basic differences between these two age groups and only certain of the technics mentioned may be used for both.

Cerebral palsy children are primarily children with patterns of growth and development. Each is a law unto himself and this should not be ignored. Secondly, this is a brain lesion, not a disturbance of arms and legs. Thus to correct structural deformities of the limbs with a brace or an operation is by no means adequately tackling the problem. Far too many cerebral palsied children are being treated solely in this way. It is also not a paralysis of individual muscles as in polio, but rather a confused control of movement patterns or motor function—and function should be underlined.

We are working not so much for normal function as for useful function. Treatment is unrealistic if it is directed to the normal when there is irreversible brain injury as in cerebral palsy. Insisting on the normal can only lead to anxiety and frustration for therapist, parent, and child. In any event, any such "driving" of a child would retard progress and defeat its own aims. Therefore, one must not demand perfection in exercises, but rather a good performance within the child's compass. In motor education constant passive therapy such as passive motion has little value as has been suggested in a study by members of the staff of the Medical School of the University of Rochester, New York. At the Forest Town School we have found passive motion invaluable, however, in mobilizing joints and preventing contractures.

In treating these cases it is well to remember that in work with human beings there is more than just the specific effect of treatment. Dr. Meyer Perlstein mentioned this in an experiment with prostigmine. The physiotherapist's personality and encouragement to the cerebral palsied child stimulated comparable improvement with either the prostigmine injection or ordinary distilled water.

In addition the part played by the parents must never be minimized. Progress can be increased or decreased by their attitudes to their child and their cooperation with the therapist. Parents should not be left to carry the responsibility of their cerebral palsied child alone, but receive all-round guidance from trained personnel.

At the Forest Town School for Cerebral Palsy, Johannesburg, in obtaining aims for the whole child, we find the different therapies are very much interlocked. For example, spatial experiences through seeing the world at different heights, angles, and places are provided by the therapist and by the teacher. Special equipment is devised by the physiotherapist to enable him to lie, sit, stand or walk in the most desired positions. These may be used in the classroom in

addition to the changes of position indoors, outdoors and within the clinic. Sensory-motor experience of shape, weight and texture, is predominantly provided in occupational therapy, nursery schooling, and kindergarten. This can be carried over into physiotherapy. At Forest Town we are developing exercises with the special beanbags suggested at Wellesley Nursery School. These beanbags are made up of different materials, and are filled with sand, beans, bottletops, marbles, or straw. Some are large, small or of various shapes. Exercises with balls of different sizes are adapted for sensory experience associated with the desired motions and motivation. We are considering whether the special training in perception carried out in our classrooms can possibly be continued in a *broad* sense in the physiotherapy room. Having learned to perceive and differentiate between heavy and light objects in the class, the associated meaning and perhaps enunciation of these words in speech therapy, the child could be asked to throw a light sand bag or a heavy sand bag.

Teacher, speech, occupational therapist, and physiotherapist all coordinate their aims through the use of rhythm and music. Action songs, finger plays, percussion band, modified dancing, and group games are specially adapted to these children—with simplicity as the keynote. Thus the physiotherapist tries to obtain the most favorable motions through rhythm and meaningful activity. She also should advise on the correct equipment for play.

Children's Medical Center

In Boston, the Children's Medical Center Cerebral Palsy Unit and its Wellesley Nursery School hold a philosophy worthy of consideration. This has been developed over a number of years by the work and stimulation of a pioneer in cerebral palsy, Dr. Bronson Crothers and his staff.

It is recognized that the cerebral palsied child is characterized by a lack of the satisfying experiences common to the usual normal child. However, instead of treating him "just like a normal child" as often stated, his distorted development and special difficulties are taken into account. Physiotherapy is correlated with the work of the cerebral palsy team to bring to the whole child experiences that he might ordinarily miss. These include the group situation, sensory-motor experiences and motor development.

Motor development is guided at a rate applicable to each child. The foundations of motor behavior should be given expression before expecting the more complicated acts such as walking. Eirene Colles, a cerebral palsy pioneer in England, stresses the need for the study of neuromotor development in relation to these cases. She particularly opposes ignoring this, and "forcing" the child to walk before developmental readiness is achieved.

In the physiotherapy room there are often many children, and group motor activities are encouraged as well as individual treatments. I wish to point out that the children for the groups must be carefully selected and the work as skillfully planned for the group as for the individual. At the Wellesley Nursery School it is believed that in certain cases individual treatment can be eliminated. Opportunity for meaningful experiences, group activity, and play therapy form the foundations of this planning for young children.

Finally, Dr. Crothers states that one must attempt to appraise and develop the assets of these children. This is difficult, as it is not a matter of a simple subtraction leaving a remainder. When a child is handicapped by a paralysis of an arm in polio, treatment is concentrated on the disabilities in efforts to ameliorate them. In cerebral palsy one must tend to the attitude of educationalists and concentrate on the abilities.

Edith Hartwell Clinic

In America at the Edith Hartwell Clinic outside Rochester, New York, the functional *abilities* are motivated and given expression. This is attempted by simplifying the environment so that the voluntary efforts of the cerebral palsied are rewarded. This provides satisfaction and stimulus to more complex tasks leading to the highest possible degree of physical independence for the child. The basic premise is, therefore, that "any child's ability to progress is no greater than the sum of his successful voluntary efforts to express himself emotionally, intellectually and physically." This active approach has been found superior to passive therapy and rigid bracing.

Dr. Winthrop Phelps

A technic of treatment prevalent today is muscle education based on specific diagnostic classifications of spastic, athetoid, ataxic, tremor, rigid, and their subclassifications. The therapist chooses methods applicable to each case, the majority of which are not new to any fully trained physiotherapist. It is rather their adaption to those specific types of cerebral palsy that has been developed by Dr. W. M. Phelps of

Baltimore, a well known pioneer in cerebral palsy. These modalities are:

1. Massage.
2. Rest.
3. Relaxation.
4. Motion from the relaxed position.
5. Passive movement.
6. Active assisted motion.
7. Active resisted motion.
8. Active motion.
9. Conditioned motion.
10. Confused motion.
11. Combined motion.
12. Balance.
13. Reciprocation.
14. Reach and grasp.
15. Skills.

Unfortunately in the space allotted, it is possible to remark on only a few of these modalities.

Massage is seldom used, probably because it does not directly educate motion. Its other stated benefits of circulation, nutrition, and tone are also incorporated in the preferred therapeutic exercises. Massage can even be contraindicated for spastics and athetoids in that it may provoke the undesired hyperirritability.

Relaxation. A modification of Jacobsen's progressive relaxation is recommended by many, particularly for the older athetoid children. Other therapists teach the patient to lie still, "floppy," and try to "let go" the whole or parts of the body. Involuntary movements are sometimes stabilized with sandbags to assist in their relaxation, and control. For the younger child, slow rhymes such as, "I'm a loose rag doll," "Little Sleepy Head," and music or stories have been tried. Phelps opposes the aid of hot baths, ear plugs, darkened rooms, soft music, and mental suggestions such as "You are feeling loose" as artificial and unrelated to the real life situations of the cerebral palsied. Yet others regard a quiet so-called "unnatural" environment desirable in the initial stages of conscious relaxation training. In these relaxation periods, however, the attitude and manner of the therapist is significant, possibly more significant, I feel, than certain of the actual methods. This greatly discussed problem is not so much the acquiring of the relaxation on the table, but the carry-over into other positions and situations.

Drugs have been used to induce relaxation, but for various reasons are not yet satisfactory, and research is still in progress. Incidentally, no drug can make a child walk and motor education will still be necessary.

Motion from a relaxed position usually follows the relaxation training. This may be carefully timed and rhythmic passive or assisted active motion. Phelps suggests progressing from passive motion to active assisted through active resisted to the active movement. It was formerly believed that resistance was more difficult and should follow active motion. Today these physiotherapists feel that resistance aimed at overcoming the muscle imbalance or strengthening of weakened antagonists to spastic muscle groups is preparatory to better active motion, e.g. if the elbow flexors are spastic, the opposing extensors are strengthened so that the child is better able to stretch and reach out for his toys.

At the Forest Town School for Cerebral Palsy we are experimenting with pulleys and weights, sandbags, weighted toys and other graduated heavy objects adapted to the needs and interests of the child. Such exercising against resistance may increase motor power, but we are also interested in providing meaning and experience of light to heavy objects.

Functional activities consist of training in balance, reciprocation, progressed to walking, and also the use of the upper limbs. I cannot agree with the fairly common viewpoint which neatly dissects the cerebral palsied child into legs as the only concern of the physiotherapist, and arms as the concern of the occupational therapist.

In discussing reciprocation, Phelps describes various kinds that need practice, i.e. between certain muscle groups and between different extremities. He says that the normal reciprocal leg kicking (or simultaneous kicking of one leg after the other) is absent in the cerebral palsied for reasons dependent on the type. This automatic function must be trained before walking is possible. Besides exercises, therapists have used tricycles, the Reciprocator, skis, pulleys or simply assisted walking in full control braces. Balance is trained in progressive positions, e.g. head and trunk balance in a special chair to sitting balance in an ordinary chair; tailor sitting; and sitting on the edge of the table. Various kneeling and standing positions wherein use is also made of head, arm, and trunk exercises are practiced by therapists in centers following Phelps' ideas.

Balance. The standing table, stabilizer, skis, parallel bars, and braces are all considered aids to standing balance, toleration of the upright position and associated strengthening of muscles involved in maintaining this balance. For many cases Phelps recommends extensive and specialized bracing as an intrinsic part of this training program. They are for control or prevention of undesirable movements, correction of deformities, occasionally support, and are said to assist in the learning of more normal movements.

Each bar or ski is a different color to obviate the use of "right" or "left" if these confuse the child in learning reciprocation. Other visual aids such as colored bows on opposite arm and leg

serve this purpose too. Placement ladder, crutches, sawhorse crutches, tripod canes and sticks are necessary in certain cases. Pushing a weighted doll's pram has been found useful for walking practice, and at Forest Town we have found walking up an inclined plane helps dorsiflexion, balance, and adjustment to changes in ground levels.

Dr. George Deaver

It is said by therapists in the field of cerebral palsy that as a normal child learns the skills of piano playing or roller skating, so must the cerebral palsied learn the ordinary everyday skills of daily living.

Deaver stresses the functions of daily living for independence and vocations. In order of importance these are:

1. A means of communication by speech if possible.
2. Maximum use of the hands, including self-help.
3. Ability to travel including locomotion.
4. General appearance of the child.

These have purposely been numbered in order of importance, for too often parents will take the child from doctor to doctor in the vain search for one "who will make the child walk." This harks back to the stress on what the child can accomplish. He may well be better able to learn to speak and use his hands, and energy should be expended more in these directions and less on gait. I am not denying the value of gait—in particular cases it can be the most important need; rather it is a plea for the best and realistic appraisal of the child for his all-round habilitation and ultimate future.

For the interests of therapists I would very much like to mention three other technics in use today.

Dr. Temple Fay

1. *Progressive Pattern Movements.* Dr. Temple Fay, Philadelphia, recommends that the cerebral palsied be taught motion in the order that they have developed through evolution to the highly skilled movements of man. The following outlines this order as he describes it.

a. Trunkal squirming movement of progression—use of the head and trunk only.
b. The use of the extremities synchronized homolaterally (on the same side) and bilaterally and then integrated to the
c. Contralateral pattern (opposite arm and leg) carried out on the same plane of the body and then advanced to the stage when the abdomen is off the ground as in
d. Reciprocal progression "on all four's."
e. Reciprocal progression on lower extremities synchronized with the contralateral swing of the arms and trunk—an exaggerated normal walking pattern.

These earlier movements of progression, also seen in early infancy, are similarly carried out by the lower vertebrates employing a simple nervous system. Dr. Fay feels that where there is brain damage to the higher centers in cerebral palsy, the lower centers, e.g. medulla, pons and even midbrain should be stimulated for these simple primitive and fundamental patterns or reflexes in the handicapped parts.

California Rehabilitation Center

2. *The California Rehabilitation Centers* have specialized *neuromuscular technics.* The foundation of these are mass movement patterns against resistance or "reinforcement." The synergistic actions, the diagonal direction and rotational factors observed are considered of importance in these movements. Timing and proprioceptive stimulation of stretch, pressure, traction as well as the use of technics below are incorporated in the reinforcement methods.

1. Repeated contractions—a voluntary contraction followed by an isometric contraction (eccentric contraction) against resistance,
2. Slow reversal—contractions of the agonist reversed to contraction of the antagonist without relaxation,
3. Rhythmic stabilization. The patient holds the joint rigid while the therapist produces eccentric or isometric contractions alternating from agonist to antagonist.

Dr. K. Bobath

3. *Reflex Inhibiting Postures.* A neurological approach is used and being developed in Britain by Dr. and Mrs. Bobath. The fundamental difficulty is believed to be the lack of inhibitory control so that reflex activity is unchecked and exaggerated. To inhibit this, the therapist positions the patient in specific "reflex inhibiting postures." Periods of normal muscle tone are produced. The proprioceptive system receives these normal impulses and guides movement so that normal motion is presumably made possible. Training of the inhibition of typical reflex movements and posture is carried out in a developmental sequence.

This brief survey of the more familiar methods indicates some of the tremendous activity in tackling cerebral palsy today. Only 20 years ago or less the world regarded these patients as hopeless and they became the "forgotten children of

society." We must not be guilty of this in South Africa. Cases must be referred to physiotherapists to prevent the gross deformities, contractures, and certain faulty movement habits which result from lack of treatment.

There has certainly been an awakening to this problem but we still have much to learn about function in cerebral palsy, especially brain function. General advancement in medical science, including further understanding of neurology and the complexity of the brain, must mean greater progress in cerebral palsy. Physiotherapists as observers and educators of disturbed human motion may well offer their contributions. Thus we in South Africa should evaluate and study our cerebral palsy patients, their responses to therapy and, as objectively as possible, record them. We cannot unquestionably accept present day methods completely just because they are often dominated by a "name." Instead, we obviously must use those findings that appear rational to us and develop them further. In closing, I must use the words of Kipling, quoted to us by Dr. Marjorie Wilson at a conference at Cambridge University last year:

"I keep six honest serving men
They taught me all I knew,
Their names are What and Why and When
and How and Where and Who."

This paper was translated into Afrikaans by Mr. Kruger of the Physiotherapy Department, General Hospital, Johannesburg.

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Use of Tetanizing Current for Spasticity

Morris Vogel, B.S., Lawrence Weinstein, B.S.,
and Arthur S. Abramson, M.D.

When spasticity is severe enough, it may become a barrier to rehabilitation. On the other hand, spasticity may be a useful adaptive phenomenon and afford protection to the patient. It may enable him to withdraw involuntarily from noxious stimuli, and by maintaining muscle bulk through involuntary exercise may protect him against the possibility of pressure ulcers. The problem is to keep spasticity at a level where it is not a barrier to rehabilitation, yet maintains its useful functions.

No single physical therapeutic procedure is capable of adequately solving this problem. Several methods when used concurrently may produce adequate, although not completely satisfactory, results in terms of lasting relief for the patient. These conservative measures include passive stretching, immersion in the Hubbard Tank at a temperature of 100°F, followed by weight bearing, with or without bracing, and resistive exercises in the upper extremities; and in cases where some voluntary motor power exists, in the lower extremities. It also has been observed, especially in paraplegics, that wearing long leg braces aids in minimizing the severity of spasticity. In patients who are not amenable to any of these therapeutic procedures, tetanization of selected groups of spastic muscle may provide at least a partial solution.

The purpose of this paper is to report on some clinical observations on the effect of tetanizing low voltage currents on the spastic person. The technic and the patients on whom it was employed will be described as well as the results obtained.

Morris Vogel, Chief Physical Therapy; Lawrence Weinstein, Assistant Chief Physical Therapy; Arthur S. Abramson, M.D., F.A.C.P., Chief, Physical Medicine and Rehabilitation Service, Veterans Administration Hospital, Bronx, New York.

PATIENTS

Twenty patients with spinal cord lesions at different levels and of different etiologies were selected. They had established diagnoses of multiple sclerosis, amyotrophic lateral sclerosis and transverse myelitis with paraplegia. The

degree of spasticity varied from moderate to severe. The age group ranged from 26 to 45 years and the duration of the disorders covered periods of from one to ten years. All of these patients had been on physical therapeutic regimens of one sort or another.

EQUIPMENT

The equipment used for this study consisted of a TECA low volt generator, model CD 7, employing direct current and alternating current with variable frequencies ranging from 2 to 2000 cycles per second, four asbestos pad electrodes of various sizes, four wire leads, a hand towel and three cotton elastic bandages.

METHOD

A moistened electrode 3″ × 5″ is placed over the quadriceps and is fastened to the thigh with an elastic bandage. A second smaller asbestos electrode 2″ × 4″, well moistened in saline solution, is placed over the gastrocnemius muscle and secured to the leg by another elastic bandage. These two pads are connected to the alternating current circuit of the low voltage generator with two rheophores. Two other electrodes approximately the same size as above are placed as follows: the larger one under the small of the patient's back, and the smaller one secured to the plantar surface of the foot, to which a well moistened hand towel has been applied. These electrodes are connected to the direct current circuit of the low voltage generator. The lead to the small of the back is of positive polarity; the lead to the foot is of negative polarity.

The direct current intensity is set at 40 volts. The alternating current is set at 2000 cycles per second and the intensity is slowly increased until the quadriceps and gastrocnemius muscles are rigidly held in an intense sustained smooth contraction. This is complete tetanization. This current strength is maintained until twitching in the muscles is observed, this being an indication that the muscle tetanus is subsiding. The alternating current intensity is then slowly reduced to zero. The current frequency is then reduced to 1200 cycles per second and the preceding technic is repeated. These steps are repeated with subsequent reductions in frequency following the onset of each stage of incomplete tetany. It is possible to maintain complete tetany with reduced current intensity as the frequency is progressively reduced. Less intensity of the alternating current is required to maintain complete tetany when the direct current is used in conjunction with it. The reasons for this are not clearly understood. The entire procedure usually covers a period of approximately 20 minutes, after which the other extremity is treated in the same manner as described above.

OBSERVATIONS

The following observations were noted in the 20 patients who were treated daily for a two-week period, using the following scale for degree of spasticity:

① Trace resistance to passive motion
② Mild resistance to passive motion
③ Moderate resistance to passive motion
④ Severe resistance to passive motion

A. Ten patients with traumatic spinal cord lesions with complete paraplegia had spasticity of the following severity prior to treatment:

1. Six were rated ④
2. Three were rated ③
3. One was rated ②

All experience relief from spasticity for periods ranging from 3 to 24 hours following the treatment. These patients were examined following each treatment with the following results:

Four of the six who prior to treatment were rated ④ had spasticity reduction to ②. The other two had spasticity reduction to ①. The other four patients had reduction to ①.

All ten reported that they were able to carry on their activities of daily living with much greater ease and comfort following the treatment.

B. Five patients with traumatic spinal cord lesions with incomplete paraplegia could not tolerate high intensities of current without pain. These patients had spasticity ranging from ② to ③. They reported relief and diminution in the severity of their spasticity which was confirmed by testing for passive range of motion. Even though the tetanus was incomplete, patients reported relief from the discomfort of spasticity for periods ranging from one to six hours. There was a ① to ② reduction in spasticity noted by the examiners immediately after treatment.

C. Four cases of multiple sclerosis rated ③, and one case of amyotrophic lateral sclerosis rated ③, could not tolerate a current of sufficient intensity to tetanize the musculature and therefore results were unsatisfactory although

some subjective improvement in comfort was reported.

It was noted that in five of the ten cases of traumatic spinal cord lesion with complete paraplegia, relief from spasticity occurred on the contralateral side following tetanization of one limb and before the contralateral limb was tetanized. In all cases, no permanent favorable effect could be noted.

CONCLUSIONS

Tetanization of spastic muscle has a temporarily beneficial effect and may be used when other therapeutic modalities are not available, are contraindicated, are ineffective, or are not acceptable to the patient. It may also be used in conjunction with other therapeutic modalities.

The direct current potentiates the tetanizing effect of the alternating current.

Tetanization is most effective where sensation is lost because the patient is better able to tolerate an effective current.

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State Registration of Physical Therapists

Listed below are the requirements for legal licensing or registration of physical therapists as provided by various state laws.

Following legal registration each law has a provision for periodic renewal of registration which must be complied with.

It is anticipated that several additional states will enact similar legislation within the coming year and members are urged to keep informed about new laws by watching for announcements in the *Physical Therapy Review*.

All laws provide that registered or licensed physical therapists may practice only on prescription and direction of licensed physicians.

Arizona

To engage in the practice of physical therapy in Arizona you must

1. Apply to the Board of Physical Therapy Examiners
2. Pay application and examination fee of $5
3. Have satisfactorily completed a course in physical therapy approved by the American Medical Association
4. Pass an examination conducted by the Board which includes practical, written, and oral tests or be registered in a state having equal standards and according a similar privilege or be registered in a registry approved by the American Medical Association

Apply to: Mrs. Elizabeth Evans
323 Virginia Circle
Phoenix, Arizona

Arkansas

To represent yourself as a registered physical therapist and/or physical therapist or physiotherapist in Arkansas you must

1. Apply to the Board of Registered Physical Therapists
2. Pay a registration and investigation fee of $30
3. Have been graduated by a school of physical therapy approved by the appropriate subcommittee of the American Medical Association
4. Prove to the satisfaction of the Board your fitness for registration under the terms of the Physical Therapists Practice Act.

Apply to: Dr. Joe Verser, Secretary
Board of Physical Therapy Examiners
Harrisburg, Arkansas

California

To practice physical therapy in California for compensation received or expected you must be registered if you are not licensed. To be registered you must

1. Apply to the Board of Medical Examiners of the State of California. Request application for registration. (Not licensure)
2. Pay a filing fee of $25
3. Have been graduated from a school or course of physical therapy approved by the Board
4. Pass an examination conducted by the Board which includes practical demonstrations, and written and oral tests.

Apply to: Board of Medical Examiners of the
State of California
1020 "N" Street
Sacramento, California

Connecticut

To represent yourself as being registered in Connecticut or to use in connection with your name the letters "R.P.T." or the words "Registered Physical Therapist" or any other letters, words or insignia indicating or implying that you are a registered physical therapist in this state you must

1. Apply to the Connecticut State Board of Examiners for Physical Therapists
2. Pay a fee of $20 or $10 if by reciprocity
3. Be a graduate of a school of physical therapy approved by the State Board of Examiners for Physical Therapists
4. Pass an examination given by the Board or be registered in a state or Province of Canada or any other country where requirements are substantially equal and it accords a similar privilege.

Apply to: Miss Sarah C. Johnson, R.P.T.
Connecticut State Board of Examiners
for Physical Therapists
165 Capitol Avenue
Hartford, Connecticut

DELAWARE

To represent yourself in Delaware as being registered with the Examining Board as a Physical Therapist or to use in connection with your name the words or letters "RPT," Registered Physical Therapist, Physical Therapist or Physiotherapist or any other letters, words or insignia implying that you are a registered physical therapist you must

1. Apply to the State Examining Board of Physical Therapists
2. Pay a fee of $15
3. Have been graduated from a school of physical therapy approved at the time of your graduation by the appropriate subcommittee of the American Medical Association or if prior to 1936 by the American Physical Therapy Association
4. Pass an examination conducted by the Board; or be licensed or certified in another state, territory or foreign country with standards determined by the Board to be as high as those of Delaware and according a similar privilege; or if practicing physical therapy apply before July 1, 1957 and meet the qualifications as set forth by the American Physical Therapy Association and for a senior member of the American Registry of Physical Therapists.

Apply to: State Examining Board of Physical Therapists
Dover, Delaware

FLORIDA

In Florida to use in connection with your name the words or letters "Registered Physical Therapist," "R.P.T." or any other letters, words or insignia indicating or implying that you are a registered physical therapist you must

1. Have been graduated from a school giving a course in physical therapy which has been approved by the appropriate sub-body of the American Medical Association at the time of your graduation, or if graduated prior to 1936 by the American Physical Therapy Association.
2. Pass basic science and physical therapy examinations
3. Apply to Dr. Mark W. Emmel, Secretary State Board of Examiners in Basic Science, University of Florida, Gainsville, Florida, and enclose $10 to pay for basic science examination. When this has been passed
4. Apply to Mrs. John W. Hedrick, R.P.T., Secretary Physical Therapy Board of Medical Examiners, Chief of Physical Therapy Department, V. A. Hospital, Coral Gables, and enclose $25 for physical therapy examination.

N.B. Basic Science examination is given about October and May and the physical therapy examination follows in not less than 2 months, nor more than 3 months afterward.

GEORGIA

In Georgia to use in connection with your name the words or letters "Registered Physical Therapist" or "R.P.T.," or any other letters, words or insignia indicating or implying that you are a registered physical therapist you must

1. Apply to the State Board of Medical Examiners
2. Pay a filing fee of $25 or $5 application fee if by reciprocity
3. Have been graduated from a school or course of physical therapy approved by the Board
4. Pass an examination or be registered in another state where the requirements at the date of registration were substantially equal and accorded a similar privilege; or be registered by the American Registry of Physical Therapists.

Apply to: Mr. R. C. Coleman, Joint Secretary
State Examining Boards
111 State Capitol
Atlanta, Georgia

ILLINOIS

To use any words, abbreviations, figures or letters with the intention of indicating practice as a registered physical therapist in Illinois you must

1. Apply to the Department of Registration and Education in writing on forms prepared and furnished by the Department
2. Pay a fee of $10
3. Be a citizen of the United States or have filed a petition for naturalization within thirty days after becoming eligible to do so
4. Have completed to the satisfaction of the Department a course in physical therapy given in a school of physical therapy approved by the Department
5. Pass an examination conducted by the Department or be registered by another state or territory or province of Canada if the requirements at the date of your registration were substantially equal.

Apply to: Department of Registration and Education
Division of Physical Therapy
Springfield, Illinois

MAINE

(Effective August 25, 1955)

To practice or hold yourself out as authorized to practice physical therapy in Maine you must

1. Apply to the Board of Examiners in Physical Therapy
2. Pay a fee of $15
3. Be graduated from a school of physical therapy approved by the appropriate subcommittee of the American Medical Association or if graduated prior to 1936 by the American Physical Therapy Association. After January 1, 1956 pass an examination conducted by the Board or be licensed to practice physical therapy in a state maintaining a standard equal to that maintained in this state.

Apply to: Miss Jeanette Pitkin
Hyde Rehabilitation Hospital
Bath, Maine

MARYLAND

To practice as a physical therapist in Maryland you must

1. Apply for license to the Maryland State Board of Physical Therapy Examiners
2. Pay a fee of $10
3. Be graduated from an accredited course in physical therapy or a four-year college course with a major in physical therapy
4. Pass an examination given by the Board or be licensed or registered by a legally constituted board with standards approved by the State Board of Physical Therapy Examiners of Maryland and whose qualifications are equal to those of Maryland.

Apply to: Maryland State Board of Physical Therapy Examiners
2411 No. Charles Street
Baltimore 18, Maryland

MASSACHUSETTS

In Massachusetts to use in connection with your name the words or letters "Registered Physical Therapist," "R.P.T.," or any other letters, words or insignia indicating or implying that you are a registered physical therapist you must

1. Apply to the Board in writing on an application form prescribed and furnished by the Board
2. Pay a fee of $25
3. Have been graduated from a school of physical therapy approved at the time of your graduation by the appropriate subbody of the American Medical Association or if prior to 1936 by the American Physical Therapy Association
4. Pass an examination conducted by the Board or be registered as a physical therapist under the laws of another state if the requirements at the date of your registration were substantially equal and the other state accords a similar privilege.

Apply to: Board of Registration in Medicine
State House
Boston 33, Massachusetts

MINNESOTA

To represent yourself as a physical therapist in Minnesota or use in connection with your name the words or letters "Physical Therapist," "Physiotherapist," "Physical Therapy Technician," "Registered Physical Therapist," "P.T.," "R.P.T." or "P.T.T.," or any other letters, words, abbreviations or insignia indicating or implying that you are a physical therapist you must

1. Apply to the State Board of Medical Examiners for registration
2. Pay a fee of $15
3. Have been graduated from a school of physical therapy approved by the Board
4. Pass an examination conducted by the Board or present satisfactory evidence of having passed the examination of the American Registry of Physical Therapists.

Apply to: Minnesota State Board of Medical Examiners
230 Lowry Medical Arts Building
St. Paul 2, Minnesota

NEVADA

To be registered in Nevada and be legally entitled to call yourself a Registered Physical Therapist or R.P.T., you must

1. Apply to the State Board of Physical Therapy Examiners and
2. Pay application fee of $25 and
3. Be graduated from a school of physical therapy approved by the Board and
4. Pass an examination conducted by the Board or be registered in another state or territory where requirements at the date of registration were substantially equal to Nevada requirements.

Physical Therapists who are assigned to the state on a temporary basis to assist in a medical emergency and physical therapists who meet Nevada qualifications may obtain permits without examination to practice for a period not to exceed six months. Temporary registration fee—$10.

Apply to: Miss Marion Barfknecht
232 West 1st St., Room 11
Reno, Nevada

NEW HAMPSHIRE

In New Hampshire to use in connection with your name the words or letters "Registered Physical Therapist," or "R.P.T.," or any other letters, words or insignia indicating or implying that you are a registered physical therapist you must

1. Apply to the Board of Registration in Medicine
2. Pay a fee of $5
3. Have completed an approved course in physical therapy in a school maintaining at that time a standard satisfactory to the Board
4. Pass an examination conducted by the Board or be registered by the American Registry of Physical Therapists or under the laws of another state or territory whose requirements the Board deems equal to those in this state.

Apply to: John S. Wheeler, M.D., Secretary
New Hampshire State Board of Registration in Medicine
Room 107, State House
Concord, N. H.

NEW MEXICO

To practice physical therapy in New Mexico you must

1. Make written application on forms obtained from the registrar of the Physical Therapists' Licensing Board in Santa Fe
2. Pay a fee of $25
3. Be a citizen of the United States or be able to present satisfactory evidence of having applied for citizenship in the United States
4. Be a graduate of a school of physical therapy in good standing (defined as having standards at least as high as those required for approval by the Council on Medical Education and Hospitals of the American Medical Association)

Apply to: Miss Ruth Bauer
Montezuma, New Mexico

NEW YORK

To practice physiotherapy in New York you must

1. Apply to the State Education Department
2. Pay a fee of $40
3. Be a citizen of the United States or have declared your intention of becoming such citizen
4. Have completed a post-secondary school training program of not less than four academic years in a college or university maintaining a curriculum for the training of physiotherapists registered and approved by the state education department or satisfy the regents that you had satisfactory equivalent training, and
5. Pass an examination given by the Board of medical examiners of the state of New York

Graduates of Registered Curriculum apply to:
John W. Paige, Chief
Bureau of Professional Examinations and Registrations
23 South Pearl Street
Albany 7, N. Y.

Graduates of Nonregistered Curriculum apply to:
Robert C. Killough, Jr.
Assistant Commissioner for Professional Education
23 South Pearl Street
Albany 7, N. Y.
(Apply, including the statement: "This is a petition to the Board of Regents under section 211 of the Education Law.")

NORTH CAROLINA

In North Carolina to represent yourself as registered and to use in connection with your name the words or letters "Registered Physical Therapist," "RPT," "Physical Therapist," or "Physiotherapist" or any other letters, words, or insignia indicating or implying that you are a registered physical therapist, you must

1. Apply to the State Examining Committee of Physical Therapists
2. Pay a fee of $25
3. Have been graduated by a school of physical therapy approved for training physical therapists by the appropriate sub-body of the American Medical Association or if graduated prior to 1936 by the American Physical Therapy Association at the time of your graduation, and
4. Pass an examination or be registered under the laws of another state or territory where requirements for registration were at the date of your registration substantially equal and a similar privilege is accorded.

Apply to: Margaret L. Moore, Secretary
Department of Physical Therapy
N. C. Memorial Hospital
Chapel Hill, N. C.

OKLAHOMA

In Oklahoma to use the title Registered Physical Therapist, or the letters "R.P.T.," or in any other way orally or in writing, in print, or by sign, directly or by implication represent yourself as a Registered Physical Therapist, you must

1. Apply to the State Board of Medical Examiners in writing on a blank forwarded by the Board
2. Pay a fee of $25
3. Be a citizen of the United States or have filed an intention
4. Have been graduated by an approved school of physical therapy or possess equal qualifications,* and
5. Pass an examination conducted by the Board or be registered under the laws of another state or territory if the requirements are substantially equal and the state accords a similar privilege.

Apply to: Mrs. Lucy Haidek, Secretary
Board of Medical Examiners
813 Braniff Building
Oklahoma City, Oklahoma

PENNSYLVANIA

To be admitted to the practice of physical therapy in the State of Pennsylvania, you must

1. Apply to the State Board of Medical Education and Licensure
2. Pay a fee of $25
3. Be a graduate from a physical therapy school approved by the Board of Medical Education and Licensure of the Commonwealth of Pennsylvania. (At the present time the Board approves all physical therapy schools approved by the Council on Medical Education and Hospitals of the American Medical Association)
4. Pass a licensing examination.

Apply to: Department of Public Instruction
Bureau of Professional Licensing
State Board of Medical Education and Licensure
Box #911
Harrisburg, Pennsylvania

* Board Rules and Regulations define:
"an approved school" as one approved by the Council on Medical Education and Hospitals of the American Medical Association and
"Equal qualifications" as member of APTA or ARPT.

SOUTH CAROLINA

In South Carolina to use in connection with your name the words or letters "Registered Physical Therapist," "RPT," "Physical Therapist," or "Physiotherapist" or any other letters, words or insignia, indicating or implying that you are a registered physical therapist, you must

1. Apply to the State Board of Examination and Registration of Physical Therapists
2. Pay a fee of $10
3. Be a graduate of a school of physical therapy approved by the appropriate subbody of the American Medical Association or if graduated prior to 1936 by the American Physical Therapy Association at the time of your graduation, and
4. Pass an examination or be registered under the laws of another state or territory where the requirements were at the date of your registration substantially equal to those in force in this state and the other state or territory accords a similar privilege.

Apply to: Miss Ruth Snelling, Secretary
State Board of Physical Therapy Examiners
Columbia Hospital
Columbia, S. C.

SOUTH DAKOTA

To be licensed in South Dakota and be legally entitled to call yourself Registered Physical Therapist, "R.P.T.," Physical Therapist, or Physiotherapist, you must—

1. Apply to the State Board of Medical and Osteopathic Examiners and
2. Pay application fee of $15 and
3. Be graduated from a school of physical therapy approved by the Board and
4. Pass an examination conducted by the Board or be licensed by another state or territory if the requirements at the date of licensing were substantially equal to requirements in South Dakota or be registered by the American Registry of Physical Therapists.

Apply to: Mr. John C. Foster, Executive Secretary
State Board of Medical and Osteopathic Examiners
300 First National Bank Building
Sioux Falls, S. D.

TENNESSEE

To practice physical therapy and be certified by the Board in Tennessee you must

1. Apply to the State Board of Medical Examiners and
2. Pay fees totalling $40 (10 application fee, $15 examination fee, $10 application fee to licensing Board after satisfactory completion of examination, $5 annual licensing fee)
3. Be graduated from school of physical therapy approved by the board and
4. Be a citizen of the United States and
5. Pass an examination conducted by the Board which includes practical demonstrations and written and oral tests or be licensed by another state or Territory if the requirements at the date of licensing were equal to requirements in Tennessee and the other state accords a similar privilege to holders of Tennessee licenses.

Apply to: Dr. H. W. Qualls, Secretary
State Board of Medical Examiners
1635 Exchange Building
Memphis, Tennessee

TERRITORY OF HAWAII

In Hawaii to hold yourself out or designate yourself as a physical therapist or physical therapy technician you must

1. Apply to the Board of Health of the Territory of Hawaii
2. File with the Board a written testimonial signed within 30 days previously by two persons licensed as physical therapist or physician in the Territory of Hawaii, a photograph and a report of a physical examination as prescribed
3. Be a graduate from a school or course of physical therapy approved by the Council on Medical Education and Hospitals of the American Medical Association or be a member in good standing of the American Physical Therapy Association, the American Registry of Physical Therapists or the Chartered Society of Physiotherapy.

WASHINGTON

In Washington to represent yourself as being registered and to use in connection with your name the words or letters "Registered Physical Therapist," "R.P.T.," or any other letters, words, or insignia indicating or implying that you are a registered physical therapist, you must

1. Apply to the director of licenses on a form furnished
2. Pay a fee of $25
3. Have been graduated by a school of physical therapy approved for training physical therapists by the appropriate sub-body of the American Medical Association at the time of graduation or if graduated prior to 1936 by the American Physical Therapy Association
4. Pass an examination conducted by the state examining committee of physical therapists, or on recommendation of the Examining Committee be registered under the laws of another state or territory where requirements at the date of registration were substantially equal and that state accords a similar privilege.

Apply to: Mr. Edwin C. Dohm
Professional Division
Department of Licenses
Olympia, Washington

WISCONSIN

To practice or hold yourself out as authorized to practice physical therapy in Wisconsin, you must

1. File written application on forms provided by the board of medical examiners
2. Pay a fee of $25
3. Have been graduated from the school of physical therapy with standards of education and training substantially equal to that of the University of Wisconsin
4. Pass an examination conducted by the state examining committee for physical therapy or be licensed or certified in another state or foreign country with standards determined by the board to be as high as those of this state.

Apply to: Emma Zitzer, Secretary
Physical Therapy Examining Committee
207 N. Brooks Street
Madison 5, Wisconsin

Editorial

As I am a guest editor and it is summer and almost my vacat.on time I just cannot be profound or professional. Vacation is the opportunity for a change, for refreshment of body and soul, and for fun. The long summer days, especially if there is daylight saving time, permit more time after work to dig in the garden, play a game of golf, or just swing in a hammock. If you are an apartment dweller as I am you can always dream—and then there is always the week end.

I, being a physical therapist, am devoted to my profession and in common with many others I work hard, for the demands are heavy. But oh how I look forward to getting acquainted again with non-professional me, to be a bit irresponsible, to wear old clothes, to soak up the sun, and to savor every lazy minute. I remember when I was about sixteen, a friend and I were making a duty call—one of those things which has to be done. We didn't know exactly how we were supposed to act but we sensed we should try to be grown up. So I said to my friend, "We will just have to throw off the cloak of childhood!" I guess we did for a short period, long enough to perform our duty. So as vacation time comes I advise you to throw off the cloak which we professional people must wear eleven months out of the year.

Some of us will elect to be "lazy," physically that is, and will catch up on our reading—maybe Ann Lindbergh's lovely book "Gift from the Sea," delight in Gertrude Lawrence as "Mrs. A," Marquand's latest "Sincerely Wallis Wayde" or the latest whodunits. Others will be hoping to break 100, a most elusive trick. Last year it was a hook, this year a slice, or the putter is just no good! Travel to near or far off places beckon and entice us. I take at least ten trips vicariously via news articles, travel magazines and folders, where the purchase value of a dollar may be stretched to five, once you get there; but getting there in turn sometimes stretches the vacation budget the other way.

Whatever you choose it is a change and you will return from your holiday feeling wonderful in body and spirit. You may have a burned, peeling nose, or a charleyhorse or two, and your hair may be sun bleached and like straw, but those are tangible evidences that you have been having a grand time. The joys of a vacation whatever

Editorial

type it is stay with you for many months. You look at your snapshots, your movies, little treasures you've picked up, you have a letter from a new friend you met—all recalling those lovely carefree days. The only frustrating part of it all is trying to get a word in edgewise with your friends on your return. Just as you are telling about the big one that got away they show a picture of one they caught; the beautiful sunset and the moonlight on your lake is topped by those on their mountain.

Vacation joys cannot be shared in the same way as professional experiences. What you saw, what you enjoyed are forever yours to be remembered when the workdays seem long and arduous. Have a lovely vacation whether it be in the spring, summer, fall, or winter. It isn't the season. It's the holiday that counts.

Association Activities

Annual Statistical Reports . . . .

Membership Report

May 1, 1954 through April 30, 1955

New members	
Active	548*
Reinstatements	
Active	32
Inactive	8
Life	1
Transfers	
Active to Inactive	319
Inactive to Active	69
Active to Life	6
Inactive to Life	3
Resignations	
Active	51
Inactive	29
Deceased	
Active	8
Inactive	1
Dropped for nonpayment of dues	
Active	147
Inactive	70
Associate	2

* Includes 32 who were not recent graduates and 18 foreign trained.

Total Membership, May 1, 1954		
Active	4,600	
Inactive	1,127	
Associate	48	
Honorary	9	
Life	34	
Student	688	
	Total:	6,506
Total Membership, May 1, 1955		
Active	4,718	
Inactive	1,282	
Associate	46	
Honorary	9	
Life	44	
Student	693	
	Total:	6,792
Net gain in membership		286

The following members passed away during the year 1954–55:

Blanche Bender	Frances LeCompte
George Buchanan	Virginia Richardson
Elaine Groat	Kathryn Roeschen
Mildred Hollenbach	Viola Visel

Beatrice Woodcock

Professional Services

May 1, 1954 through April 30, 1955

Placement Services

121 Physical therapists are presently active on our Placement Service.

220 American Physical Therapy Association members were removed from the Placement Service files following a report that their placement needs had been met.

21 Foreign trained physical therapists are presently active on our Placement Service, for positions in United States facilities under the supervision of a member of the American Physical Therapy Association.

24 Foreign trained physical therapists have been removed from our files following a report that their needs have been met.

386 Physical therapists have had, or are presently having, the assistance of our Placement Service.

426 Facilities were active on our Placement Service as of May 1, 1955 in the United States.

7 Facilities were active on our Placement Service as of May 1, 1955 in foreign countries.

397 Facilities have been removed from our Placement Service files, following written reports that their needs have been met.

7 Facilities outside of the United States have been removed from our files following reports that their needs have been met.

837 Facilities have had, or are presently having, the assistance of our Placement Service.

303 Positions were available as of May 1, 1955 for new graduates.

233 Positions were available as of May 1, 1955 for physical therapists with experience.

7 Positions were available as of May 1, 1955 outside of the United States.

364 Positions have been removed from our files following a written report that the positions have been filled.

7 Positions in countries outside of the United States, have been removed from our files following a written report that the positions have been filled.

35 Positions have been removed from our files following a written report that the positions have been abolished.

949 Positions have had, or are presently having, the assistance of our Placement Service.

Physical Therapy Review
Circulation and Advertising Report

May 1, 1954 through April 30, 1955

Circulation	1954-55	1953-54	Increase
	6,891	6,663	228
Nonmember subscriptions	1,237	1,082	155

The *Review* goes to the following 47 foreign countries:

Arabia	1
Argentina	2
Australia	44
Belgium	13
Bermuda	1
Brazil	6
Br. West Indies	1
Canada	57
Caroline Islands	1
Chile	2
Colombia	5
Cuba	9
Czechoslovakia	3
Denmark	19
England	17
Finland	5
France	11
Germany	5
Greece	3
Haiti	1
Holland	6
Hong Kong	1
India	7
Israel	16
Italy	12
Japan	3
Korea	3
Lebanon	1
Liberia	2
Luxemborg	1
Mexico	12
New Zealand	2
Norfolk Islands	1
Norway	19
Pakistan	2
Portugal	1
Scotland	1
Singapore	1
South Wales	1
Sweden	21
Switzerland	9
Turkey	2
Union of South Africa	10
U.S.S.R.	4
Uruguay	4
Venezuela	2
Yugoslavia	2
1954-55	352
1953-54	333
Increase	19

Advertising

In 1954-1955

Paid advertising in a 706-page volume was 123 pages.

In 1953-1954

Paid advertising in a 708-page volume was 88⅞ pages. An increase of 34 pages.

In 1954-1955

There were 15 pages of classified advertising.

In 1953-1954

There were 16¾ pages of classified advertising. A decrease of 1¾ pages.

In 1954-1955

There was one special issue—July 1954—the Conference issue.

Educational and Recruitment Grant Renewed

The National Foundation for Infantile Paralysis has made a grant of $74,530, effective July 1, to the American Physical Therapy Association for the support, among other things, of the Association's intensive program of student recruitment in the field of physical therapy.

This was announced jointly by Basil O'Connor, National Foundation president, and Mildred Elson, executive director of the Association, who will supervise its educational, advisory, and recruitment program.

Additional March of Dimes grants each year since 1946 totaling over $275,000 have gone to the support of the Association's consultant service to physical therapy schools, liaison with the medical profession, as well as the student recruitment program.

Additional physical therapists are needed for the medical teams that provide total care for victims of polio and other handicapping conditions in many institutions today, Miss Elson pointed out. The American Physical Therapy Association is now bringing the interesting career possibilities in this field to the attention of college and high school students and their parents.

The National Foundation's grant in aid to the Association is part of a comprehensive program in support of professional education, which today ranks as the largest ever undertaken by a voluntary agency. Since 1938, more than $20,250,000 in March of Dimes funds have been authorized to train professional personnel, and to help medical and other professional schools and associations maintain and improve their educational standards and services.

32nd Annual Conference

There must be something about APTA Conferences. Every year they shatter prediction. This year of 1955, total attendance in St. Louis was 663 members and guests, more than 200 above our early estimate. Some predicted that our members wouldn't like the workshop method of learning. They loved it! Some prognosticated that banquet attendance would be low—466 came, and went on to boo and applaud the Goldenrod Showboat players. Others were worried about apathy toward the Second Congress of the World Confederation in New York in 1956. Over $300 was contributed toward the Congress budget.

This was a working conference in which nearly ten per cent of our membership did it themselves and really got acquainted.

The daily conference newspaper the *Paddle Wheel Tattler* was out every morning to help spread the news.

For the first time in its history the Association awarded several citations.

The House of Delegates was in session two half days and made some eventful decisions.

Forthcoming issues of the *Review* will give further details of the Conference. Watch for annual reports in the September issue and plan now to join the Second World Congress in New York in 1956.

Marriages

Elizabeth A. Grombacher of Youngstown, Ohio, now Mrs. Elizabeth G. Pallante, Youngstown.

Ruth Hilderbrant of Saraland, Ala., now Mrs. Ruth H. Barret, Kansas City, Mo.

Mary Kelley of Cheyenne, Wyo., now Mrs. Mary K. Fraher, Cheyenne.

Jean Meyer of Washington, D.C., now Mrs. Jean M. Hontalas, San Francisco.

Alice V. Moller of Modesto, Calif. to Charles Brown, Ceres, Calif.

Magdalena Oanea of Baltimore, Md. to John B. Ferguson, Baltimore.

Beverly Price of Providence, R.I. to Frederick Mernick, Providence.

Eunice S. Wallis of Washington, D.C. to Claude E. Badoux, Washington, D.C.

Inge Alice Weinberg of New York, N.Y. to Daniel Rudman, New York.

Contributions for the Second Congress World Confederation for Physical Therapy

In St. Louis the funds for the Second Congress were increased by $265.54. Through the courtesy of the National Foundation for Infantile Paralysis the familiar milk bottles used in their campaigns were made available to us. Contributions were received from 46 states and the District of Columbia, territories of Hawaii and Alaska, and Puerto Rico. A guessing contest on the amount collected in the milk bottles was held with a free membership to the Congress as a prize. Mrs. Elizabeth Storey of Detroit, Michigan, was the winner.

In addition the Physical Therapy Alumni of the University of Pennsylvania in attendance at the Conference contributed $18.00. The Eastern Missouri Chapter sold its table favors, a Mississippi Show Boat, and contributed $72.00.

The contributions received to date from Chapters are as follows:

State	*Amount*	*Per cent*
Arkansas	$ 26.00	137
Southern California	63.92	15
Delaware	30.00	107
District of Columbia	109.00	87
Illinois	300.00	92
Kansas	41.00	69
Louisiana	30.00	58
Maine	20.00	54
E. Missouri	72.00	105
North Carolina	100.00	101
Western New York	100.00	85
Southern Oregon	32.00	152

Total contributed to date $1,125.46 — Minimum goal $6,700!

Preliminary programs of the Congress are being mailed to all members this month. Membership forms are attached to the program for your convenience.

A colorful poster is available on request to post in your department.

State of Wisconsin Licensing Examination

The Physical Therapy Examining Committee of the State Board of Medical Examiners of the State of Wisconsin announces that its next licensing examination will be held September 19-20, 1955 at Madison, Wisconsin.

Any physical therapist interested in practicing in the state of Wisconsin, who is not now licensed in Wisconsin, should contact the secretary of the Physical Therapy Examining Committee, Emma Zitser, 207 North Brooks Street, Madison 5, Wisconsin.

Reciprocity candidates will be examined at this time. Application should be returned to the Committee by September 1, 1955.

New York University-Bellevue Medical Center

Announcement of the following four-week advanced course in physical rehabilitation methods has been received. The course is open to certified physical therapists who have the approval of the curriculum director. Four points of either undergraduate or postgraduate credit is given.

Name of Course

Advanced Course in Physical Rehabilitation Methods

Sponsor of Course

New York University-Bellevue Medical Center, The Institute of Physical Medicine and Rehabilitation in conjunction with New York University School of Education

Dates of Course

November 21–December 16, 1955
February 6–March 2, 1956
April 30–May 25, 1956

Hours

Mondays, Wednesdays, and Fridays—9:00 A.M. to 4:00 P.M.
Tuesdays and Thursdays—9:00 A.M. to 5:00 P.M.

Course Content

The course is divided into three sections: 1. Severe Disabilities and Their Rehabilitation; 2. Skills and Methods of Functional Activities; 3. Clinical Experience

Fee

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Physical Therapy Programs—1955

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*Accepts women students only.

Please direct all inquiries regarding tuition, entrance requirements and other specific information to the school and *not* to the American Physical Therapy Association.

Abstracts

The Child with Hemiplegia.

Sidney Keats, AM. J. DIS. CHILD., 89:421-425, April 1955.

In most rehabilitation centers, the affected arm in the hemiplegic cerebral palsied child is treated vigorously without regard to the possible disastrous sequelae of such treatment when it involves the inherited dominant side. The complicated hemiplegias may exhibit such variations as speech disorder, seizures, mental retardation, and behavior disturbances. Before any treatment is started for the handicapped arm of the hemiplegic child, it is of extreme importance to determine whether the handicap is on the inherited dominant side or on the subdominant side.

When the handicap is so severe from the time of birth that the child does not use the arm at all, a complete shift to the subdominant hand takes place in early infancy. These "complete" shifts rarely show the usual complications. However, if the handicap is mild, the tendency to shift is delayed because of the strong drive to use the inherited dominant hand despite its handicaps. This results in an "incomplete" shift of the dominant hand and it is at this point that the previously mentioned complications may develop. Then, every effort must be made to complete the shift to the subdominant hand as quickly as possible. This can be accomplished by avoiding all treatment of the involved arm, and concentrating effort on training the uninvolved hand to be as skillful as possible.

A study was made of 87 hemiplegic children with special emphasis on handedness. The highest incidence of complications appeared in those patients who were required to shift to the subdominant side. A child was classified as an "incomplete shift" when he presented at least two or more complications. As soon as these complications were noted and verified, treatment for the handicapped arm was stopped immediately, and was directed at the uninvolved arm. When this was done, invariably the speech improved, seizures stopped or were amenable to control with medication, personality and behavior improved, and better psychological scores were noted.

The Place of Physiotherapy in the Treatment of the Rheumatic Disorders.

W. Yeoman, BRIT. J. PHYS. MED. 18:76-81, April 1955.

Before attempting to treat any disease it is necessary to be able to answer three vital questions: (1) What is the nature of the disease to be treated? (2) What is hoped to be achieved by treatment? (3) What treatment is most likely to bring about the desired results?

The author divides the rheumatic disorders into the acute and chronic phases, and subdivides the chronic phase into articular and nonarticular types. The articular type is divided into rheumatoid and osteoarthritic disorders.

Rheumatoid arthritis is a nonsuppurative polyarthritis of unknown etiology and has yet no known cure. The disease is characterized by acute exacerbations and periods of remission. The disease has been known from the earliest ages, and evidence of the disease has been found in Egyptian mummies dating approximately 3,000 B.C. It has been described in medical literature under various names from Hippocrates downward, but was not really differentiated from other types of arthritis until about 150 years ago.

Related to rheumatoid arthritis and frequently associated with it is ankylosing spondylitis. The British consider this disease a separate entity. In the early stages the best treatment is radiotherapy with physical therapy to retain as much movement as possible, particularly in the dorsal and cervical areas. Measurements of chest expansion and vital capacity should be kept.

In osteoarthritis there are degenerative changes in joints where the cartilage has been eroded and the ends of bone exposed to the traumatic effects of movement. From the age 45 on large proportions of the population in England tend to show signs of osteoarthritis, particularly in weightbearing joints. It is important to prevent as well as treat osteoarthritis.

Objectives of treatment are relief of pain and restoration of function with a goal based on the physical and psychological capacity of the individual patient. This requires a team approach for evaluation and treatment. The physical therapist must have an interest in the disease and a real desire to help the patient fight the insidious feeling of hopelessness and disinclination to make further effort.

Hydrotherapy is valuable since the painful joints can be moved easily in water and the heat will reduce pain. Massage is of limited value in the field of rheumatism. It should be used as a means of relaxing the patient. Faradic current may be of some value in the process of rehabilitation of a muscle atrophied from disuse. It should be used to educate the patient in voluntary use of the muscle but, once the patient can actively do the movement, he should start regular and voluntary exercise. Heat is one of the principal requirements of the rheumatoid patient. Infra-red radiation and short wave diathermy are both used. Remedial exercises and occupational therapy play an important role in the treatment of these patients. Both should be carefully geared to the individual patient.

Some Aspects of Shoulder Pain.

Olof Olsson, BRIT. J. PHYS. MED. 18:82-88, April 1955.

The cuff of the shoulder joint (the conjoined parts of the teres minor, infraspinatus, supraspinatus, and subscapularis tendons and the joint capsule) and the intra-articular portion of the long head of the biceps degenerate early in life. Shoulder pain and degeneration of the cuff parts of the shoulder point become more frequent in higher ages.

The author studied a clinical series of 743 patients and a morphological series of 106 shoulder joints obtained from patients who died within three months of a physical examination.

From the clinical series they discovered shoulder pain to be most frequent in groups from 40 to 69 years of age. In the third decade men and women apparently contract shoulder pain approximately equally often. The frequency for women seems to remain at the same low level until the sixth decade. It gradually rises to the level for men in the fourth to sixth decades. From the seventh decade, the two sexes seem to have approximately the same incidence of shoulder pain.

Dividing the material according to the occupation of the patient revealed no difference in the frequency of shoulder pain among the different groups. The fact that

shoulder pain occurs equally often on the right and left side suggests that the work performed by the patient has little if any place in the causation of shoulder pain.

It has been suggested in the literature that diseases in other organs can influence the susceptibility to shoulder pain. The author found that cardiac disease had a place in the causation of shoulder pain. In this study it was shown that inactivity, whatever its reason, can produce shoulder pain. The author states that motion therapy several times daily is the best way to prevent pain.

The morphological examination revealed two types of degeneration, one leading to tendon and capsular ruptures, and one to calcareous deposits or tendinitis calcarea.

The author believes that the cause of these rupture-producing degenerative changes of cuff and biceps tendon is their curvature over the articular surface of the humeral head. These parts are under constant pressure, and it is a generally accepted fact that pressure leads to nutritional disturbances which, in turn, lead to degeneration. Friction of the cuff against the acromion and intermittent pressure between the acromion and the humeral head can cause degeneration.

The second type of degeneration noticed in the cuff were those changes that are called calcareous deposits. The series was too small to justify a statement with regard to the cause of the deposits.

Amyloidosis in Paraplegia.

A. Estin Comarr, CALIFORNIA MED., 82:332-334, April 1955.

The occurrence of amyloid disease as a cause of death in patients with chronic spinal cord injury was found to be 6 cases out of 73 death occurring in a review of 1,000 cases. Four patients with the disease are still living.

The amyloidosis found in paraplegia is classified as secondary amyloidosis. It was found to involve the kidneys, spleen, liver, and adrenal glands of the six cases at necropsy. All patients had pathological changes of the genito-urinary tract and/or severe long-standing decubitus ulcers.

The Congo red retention test was performed on 102 patients in a paraplegic service. No correlation was found between the Congo red retention and the length of time since injury or the site of the spinal cord lesion. The four patients still living with the amyloid disease had more than 90 per cent retention of the Congo red solution.

The author agrees with other observers who consider the triad of urinary infection, chronic osteomyelitis, and decubitus ulcer as the cause of secondary amyloidosis in cases of spinal cord injury. Pyelonephritis is believed to play a minor role to that of decubiti and osteomyelitis. It was also felt that while no definite time relationship could be found, that the longer decubitis ulcer persists, the greater is the probability of amyloidosis.

The personalities of the 6 deceased patients and the 4 still alive with the disease showed autistic tendencies from the onset of their disability and the ensuing behaviorism could be characterized as leading to "psychological suicide."

The most important consideration is the prevention of amyloid disease by prophylactic measures. Adequate early nursing care and optimum nutritional status will prevent decubitus ulcers.

Diaphragmatic Respiration in the Quadriplegic Patient and the Effect of Position on His Vital Capacity.

G. S. Cameron, J. W. Scott, A. T. Jousse and E. H. Botterll AM. SURG., 141: 443-450, April 1955.

The quadriplegic patient maintains respiration with the diaphragm alone. This reduces his vital capacity to 65 per cent of its normal value. Effective coughing is impossible so that accumulation of bronchial secretions produces a constant threat of atelectasis and pneumonia. Postural drainage for these patients has never been fully exploited because of the difficulty of maintaining cervical traction in the head-down position. The purpose of this article is to report a simple method of maintaining cervical traction in the drainage position and to report on the effects of various positions on the respiratory mechanism of quadriplegic patients.

Eleven patients participated in the study, all with lesions between C-5 and C-8 and complete motor and sensory loss below the site of the lesion.

Atelectasis and pneumonia can be prevented by postural drainage with the patient tilted 15° head down. In this position the quadriplegic patient's vital capacity is 6 per cent greater than in the horizontal position and 13 per cent greater than when he is tilted 15° head up. This change in vital capacity is due to a shift in the resting level of the diaphragm, and is not observed in the normal person. The 15° head-down position provides adequate bronchial drainage and can be tolerated indefinitely.

Padded boots fixed securely to the bottom of the bed permit the maintenance of cervical traction.

These observations on the effect of position on vital capacity may be applicable to normal subjects when anesthetized.

Treatment of Mental Disease by Sleep.

O. V. Kerbikov (Moscow), LANCET, 1: (No. 6867), 744-745, April 9, 1955.

Several methods were used to induce sleep in patients with mental disease. The main indication for sleep therapy is in patients developing protective inhibition. Sleep therapy is less valuable in excited patients than in those showing depressive-inhibitory states.

In the method of "electro-sleep," a current of 5-15 mA, and 1-20 stimuli per second was applied with the electrodes placed over the orbito-occipital position. The course of treatment was given in 10 to 20 daily applications each lasting about 2 hours. Usually after 15 to 30 minutes the patient felt drowsy and sleepy. The best results were obtained in patients with neuroses and psychogenic reactions displaying asthenia and asthenic depression, but without severe psychotic features. Permanent benefit was not obtained in obsessional states. Among the advantages of electro-sleep are the almost absence of somatic contraindications and the possibility of its use for outpatients. Drawbacks include the difficulty of regulating the depth and length of sleep.

Sleep was also induced after intravenous infusion of ethyl-alcohol solution. Daily injections lasting 1½ to 2 hours were administered. The duration of sleep after each infusion was about 3 to 5 hours. Among schizophrenics, good remis-

sions were obtained in about half the cases. The best results were in patients with protective inhibition. Good results were obtained in patients with psychogenic reactive states. Children were not treated by this method.

Amylobarbitone and caffeine were used together successfully in neurotic patients showing asthenic and chronic reactive states. The paper also includes a brief discussion of the use of nitrous oxide as a sleep-inducing agent.

Pathology of Cerebral Palsy.

Abe Towbin, ARCH. PATH., 59:397-411, April 1955.

Despite the high incidence of cerebral palsy and the wide clinical interest in this problem, the underlying pathologic processes in this disorder have long remained an enigma. Consideration of the etiologic factors and organic changes in cerebral play merits wider attention. Little, in his original thesis, postulated that most spastic states observed in children were due to neonatal asphyxia. In the last hundred years, however, there gradually evolved the misconception that the dominant etiologic factor in cerebral palsy was related to head injury associated with meningeal hemorrhage incurred during the process of birth. In recent years, investigative discoveries in obstetrics, pediatrics, hematology, and neurology have contributed significantly in dispelling deeply ingrained misconceptions which have attended this problem.

Cerebral palsy refers to motor disturbances which are mainly pyramidal or extrapyramidal in nature. The responsible lesions in the brain vary in origin; all are incurred during intra-uterine or early infantile life. In analyzing the cases in the present study, three pathologic types were evident: in the first type the lesion was due to a developmental arrest of the brain; in the second type the cerebral lesion, destructive in nature, was the result of an antecedent systemic disorder present in fetal or infantile life; in the third type, the encephaloclastic lesion represented an intrinsically local intracranial disorder.

The present report deals with the first type, cerebral palsy due to hereditary and induced developmental cerebral defects. Most developmental anomalies of the brain are induced; these defects represent the imprint left in the nervous system by exposure of the early fetus to maternal infectious disease, irradiation, or other noxious gestational influences. Developmental faults of the brain were associated with clinical manifestations of cerebral palsy in six cases of the series studied. In the most severe case, an eight year old child displaying profound motor disturbances and mental deficiency, the brain at autopsy had the architectural features of a 5 month fetus. In addition to the microcephaly vera portrayed grossly, histologic evidence of developmental arrest was evident. In cases of less severe involvement, the brains showed localized anomalous development of the motor cortex. In general, the degree of motor disturbance displayed by the patients during life was proportional to the extent of developmental arrest observed in the brain at autopsy. The findings in this group, constituting approximately one-fourth of the cases of cerebral palsy coming to autopsy during the five year period of this study, indicated the importance of faulty organogenesis as a cause of cerebral palsy.

The Differential Diagnosis of Flaccid Paralysis.

P. H. Sandifer, PROC. ROY. SOC. MED., 48:186-189, March 1955.

This paper concerns a few of the clinical situations in which there is doubt about the diagnosis—doubt about the site and nature of the lesion underlying flaccid paralysis.

The types of flaccid paralysis are divided into five categories. The first one is flaccid paralysis in early childhood. It is emphasized that amyotonia congenita as described by Oppenheim is not a disease but a syndrome and many diseases are mentioned which can produce this syndrome. The second and third categories are the secondary myopathies and the distal myopathies, each presenting problems of differential diagnosis. Chronic progressive opthalmoplegia is also a symptom which may be a component of many diseases. Finally the term "myasthenic myopathy" is applied to a group of diseases having histological changes similar to those found in myasthenia gravis.

It is the plea of the author that an exact diagnosis is necessary so that the parents of these children may be helped with useful advice and be given a forecast of what will happen. In making the diagnosis, it is often necessary to require the help of histological and electrodiagnostic tests. Interesting articles follow which describe new muscle biopsy technics and electrodiagnosis in motor unit dysfunction.

The Vital Capacity as a Measure of the Spontaneous Breathing Ability in Poliomyelitis.

B. G. Feris, A. Warren and C. A. Beals, NEW ENGLAND J. MED., 252: 618-621, April 14, 1955.

The present study was undertaken to obtain data that might have a bearing on the optimum time when paralyzed patients should be placed in tank respirators during the acute illness of poliomyelitis and as a guide in the weaning program.

Patients with respiratory-muscle paralysis were studied in the acute and in the convalescent stages. In convalescent patients the optimum unassisted time was determined by measurement of the vital capacity at regular intervals during a period of continuous unassisted breathing. The appearance of a sustained fall of 15 to 20 percent in the observed vital capacity was taken to represent the onset of "fatigue" of the functioning respiratory muscles.

The optimum unassisted breathing time or the breathing time without "fatigue" was considered to be the interval before such a sustained fall in the vital capacity. The pulse and respiratory rate were counted for a minute interval, and the blood pressure was measured; an increase of 15 to 20 per cent in any of these records was taken as an early sign of ventilatory insufficiency with probably carbon dioxide retention, and the test was stopped. "Unassisted-breathing time" was determined by the patients' subjective sensations, by the clinical judgment of the resident staff and by the observations of clinical signs such as increased pulse and respiratory rate, dilatation of the alae nasi, use of accessory muscles of respiration and flushing of the skin.

As a result of these observations from the Mary MacArthur Memorial Respirator Center, Wellesley, and the Children's Medical Center, Boston, certain criteria were outlined

to determine when respiratory assistance should be given during the course of poliomyelitis and as a guide in the weaning program.

End Results in Suction Socket Prosthesis for Above-Knee Amputees.

Augustus Thorndike, AM. J. SURG., 89: 919-923, April 1955.

This report concerns experience with 2,185 cases of the use of lower extremity suction socket protheses for above-knee amputees. This type of limb was studied in a variety of geographic locations under varied climatic conditions in Veterans Administration Hospitals. Over a period of seven years there have been 15.7 per cent failures (343 cases) revealing that almost 85 per cent of the above-knee amputees are still wearing the suction socket.

Analysis of the failures reveal that the greatest number occurred in the early stages of the program. As the experience of the surgeon and prosthetist increased in regard to selection of cases and deliberate fitting of difficult cases the percentage of failures decreased.

There are four fundamental requirements to be met prior to prescription of a suction socket prosthesis: (1) a well muscled and contoured stump with a minimum of fat; (2) the selected amputee must reside in an area convenient to a limb shop for multiple adjustments and check-ups during the six-month trial period; (3) he must have employment from which he can obtain leave to visit the shop at frequent intervals; (4) he must be motivated to devote the time necessary for gait training with the new prosthesis.

Certain physical factors bear upon successful prescription of a suction socket. Some of the causes for failure in this series included: (1) skin allergy or skin disease, (2) loss of suction due to shrinkage of the stump, (3) pain or loss in body weight, and (4) excessive perspiration. Initial selection of poor risks, inadequate motivation, and feelings of insecurity with the prosthesis accounted for the remainder of the failures.

It is believed that the incidence of failure may be reduced to that of 5.9 per cent, the incidence reported in six of the most successful clinics participating in this study.

A Method of Treating Chronic Leg Ulcers.

S. W. Barefoot, NORTH CAROLINA M. J., 16: 101-102, March 1955.

Absorbable gelatine sponge or powder and the parenteral administration of Vitamin B-12 were used in the treatment of chronic leg ulcers. Before this regime was started, an attempt was made to reduce secondary infection and edema. The patient was put to bed for a few days with the foot elevated and antibiotics administered. The ulcer was then sprinkled heavily with Terramycin Topical powder and packed with absorbable gelatine. The leg was wrapped with an adhesive elastic bandage over gauze bandages. The patient was permitted to be ambulatory. Bandages were removed weekly, at which time 30 to 45 micrograms of vitamin B-12 were given subcutaneously or intramuscularly.

If, at the time of re-application, the absorbable gelatine was loose, it was removed, the ulcer débrided and cleansed with ether and hydrogen peroxide. When complete healing occurred beneath the absorbable gelatine, it became loose and fell free or was easily wiped off.

Twenty-three patients with chronic stasis leg ulcers secondary to varicosities or to old thrombophlebitis were treated with this method. All ulcers healed. The time required for healing varied with the size and duration of the lesions. It is believed that this method shortened the healing time of the ulcers.

Electrodiagnosis in Poliomyelitis.

Alex J. Arieff and Norman Dobin, NEUROLOGY, 5:278-283, April 1955.

Sixty-two patients with 94 paralyzed and 91 recovering muscles were examined electrically at various times ranging from two weeks to nine years after onset of paralytic poliomyelitis. The examination included galvanic rheobase, polar ratio, chronaxie, repetitive stimuli (interval) curves, cathodal tetanus ratio, faradic response, and electromyographic observations. Serial examinations were not available on all of the 62 subjects; such a study would amplify the present report.

For the most part, galvanic data were consistent with other lower motor neuron lesions, but the faradic response was most consistent with eventual clinical picture of recovery or paralysis. The threshold to faradism may be elevated early but soon becomes close to normal in approximately 90 per cent of the muscles destined to recover. In the group of permanently paralyzed muscles, 100 per cent of the muscles failed to respond to faradism early after the onset of paralysis and this persisted even up to nine years.

Electromyography revealed active potentials in recovering muscles a few weeks after paralysis. None were present in the chronically paralyzed muscles even in the presence of marked neuromuscular pain, that is, no spasm units were found. Fibrillary potentials were present in both groups and disappeared in most of the recovered group at the end of a year, but were present in 40 per cent of the chronic muscles years after paralysis.

The median fibrillary denervating voltage was 100 to 125 microvolts, which is greater than those usually encountered. High voltage spontaneous units were not observed.

Information of prognostic significance can be obtained with the use of the relatively simple faradic apparatus and its use should not be neglected when more elaborate and expensive apparatus such as the square wave stimulator or the electromyograph are not available.

Effect of Combined Afferent Lesions on Motor Function.

Arthur M. Lassek, NEUROLOGY, 5: 269-273, April 1955.

A total of 16 Macacus monkeys were operated on surgically involving the production of combinations of lesions in the dorsal roots, the parietal cortex and the posterior columns. The purpose of the experiment was to substantiate the belief that the afferent system as a whole may possibly be vital in carrying the impulses which initiate, direct, and control voluntary movement.

Combined lesions involving the dorsal roots, the dorsal columns and the parietal cortex in the monkey produced serious and relatively long-lasting deficits affecting all aspects of motion, tonic, postural, and phasic. No restitution of function was possible within one year. Single lesions of these three systems caused widely divergent results, both in the

degree and the quality of paralysis. The divisions, ranked according to severity of motor loss and tone, are as follows: dorsal roots, parietal cortex, posterior columns. The first is near maximal and the last near minimal. The flaccidity which occurs when all the dorsal roots to an extremity are severed offers a standard for pure or near pure flaccidity; it is believed that no cortical operation, whether motor or sensory cortex, matches the dorsal root atonia either from the acute or chronic viewpoints. Different neurologic factors or influences affecting motor physiology seem to operate in the dorsal root, the posterior column and the parietal cortex.

The Little Strokes.

Walter C. Alvarez, J.A.M.A., 157: 1199-1204, April 2, 1955.

The disease in which man is gradually pulled down over a number of years by a series of thromboses of the little arteries in the brain is exceedingly common. Diagnosis is difficult, because the patient usually has none of the objective signs associated with brain damage such as weak muscles, speech impairments, or areas of anesthesia. It is likely, however, that the patient suffers changes in character, judgment, and emotional stability. Symptoms may be mental or physical disability which may be out of proportion to the mild thoracic or abdominal pain complained of; dizzy spell or blackout may be followed by character changes, or nervous breakdown with a queer group of symptoms appearing suddenly. These patients may show loss of previous abilities, fear of being alone, premature aging and slowing down, loss of interest in life, changes in writing, speaking or swallowing, fear of falling and a variety of other complaints. Frequently the symptoms may lead to false diagnosis associated with other organic problems.

As far as the treatment of the disease is concerned, little can be done. Onset can be delayed by holding down a person's weight and reducing the amount of cholesterol in the diet. Prompt administration of cortisone may be helpful. Prognosis depends on how much of the brain has been destroyed. It is recommended that the family and the patient be acquainted with the real nature of the illness. Others should be informed when it is necessary to make arrangements concerning business, since these patients are frequently unable to make administrative judgments, or in many cases to perform tasks essential to productive employment.

General Principles of Bracing in the Lower Extremity.

L. D. Policoff and H. W. Park, SOUTH. M.J., 48:363-370, April 1955.

This paper is a discussion of some of the general principles concerned with bracing for the lower extremity. Indications, purposes and construction are included as well as factors in the psychological preparation of the patient for their use.

Since the shoe is the keystone of the lower extremity brace, it should be correctly fitted; it should be prescribed by the physician and checked before the brace is attached. The shank, supported by a steel insert, should fit snugly under the longitudinal arch. The heel and sole should be stable and rest flat on the floor. The metal part of the brace is usually made of a solid bar, surgical steel for the joints and locks, and 24S-T aluminum for uprights and bands. There are three basic types of ankle joints: (1) the stirrup joint, for example the Klenzak joint, is advantageous in that the mechanical joint simulates the anatomical joint; (2) the calipur joint is easier to put on, as the removable uprights insert into the heel channel. This type, however, often causes rubbing and irritation of the leg due to the piston-like thrust of the brace; (3) the coil-spring joint is not as durable, but yet is lighter in weight and less expensive.

For a patient with a functional foot drop deformity such as occurs following hemiplegia or peripheral nerve injury, a short leg brace is needed. Incorporated in such a brace may be: (1) stirrup ankle joint with coil compression spring for dorsiflexion, (2) anterior and posterior stops where limited motion at the ankle is desired, and (3) wedges or T-straps if correction for inversion or eversion is indicated. Placement of the calf band in a short leg brace should be one finger breadth below the head of the fibula.

The length of the long leg brace should be such that the leg and not the brace bears the body weight. For the knee joint, a simple hinge joint with anterior offset of the uprights just below the articulation and an outside drop ring lock is used. The ischial weight-bearing brace is longer than the long-leg brace and is used to eliminate weight-bearing in an extremity by the addition of a padded metal ischial weight-bearing seat. The sole of the foot should be about one-fourth of an inch above the inner sole of the shoe when the brace is correctly designed so that the ischial tuberosity cannot slip from the seat.

In cases of severe pelvic girdle and lower extremity weakness, the authors recommend support of the thoracic-pelvic relationship by corseting or bracing in a manner which leaves the long leg braces free instead or incorporating a pelvic band. Ambulation with this method of support requires less muscular strength and endurance.

The Experimental Anatomo-physiologic Approach to the Study of Diseases of the Basal Ganglia.

Fred A. Mettler, J. NEUROPATH. AND EXPER. NEUROL., 14:115-141, April 1955.

Many neurologic disorders are complexes rather than entities and consequently are precipitated by a variable pathophysiology. Therefore, the search for the etiology of such disorders should consist of analyses of the basic physiologic distortions which combine to make up these conditions. It may then be possible to determine what structural circumstances lie behind each of these basic physiologic distortions.

An excellent discussion of the functional elements found in neurologic and psychiatric disorders is presented. These include paresis and paralysis, defects of afferent conduction, ataxia, hyperkinesia, tremor, choreoid activity, ballism, athetosis, hypokinesia, rigidity, spasticity, and perceptual disorders.

This paper presents an approach to parkinsonism which has been based upon experimental data and methods. It suggests a manner in which many other neuropsychiatric disorders, particularly those involving basal ganglia, may be approached.

The complex of parkinsonism is defined, the pathological findings

discussed, and a satisfactory structural basis for each element in the disease complex is found. It is then noted that most of the mechanisms concerned lie in a small area, and that this is an area of cerebral blood supply which is transitional between the great reservoirs of the basilar and carotid arteries, specifically in the region supplied by the posterior communicating artery. This region is vulnerable to drops in blood pressure or to any circumstance which narrows the diameter of the vessels. Therefore, this cerebrovascular pathology could alone account for involvement of each of the systems found to be involved in parkinsonism.

Age Differences in Ventilatory and Gas Exchange Responses to Graded Exercise in Males.

A. H. Norris, N. W. Shock, and M. J. Yiengst, J. GERONTOLOGY, 10:145-155, April 1955.

A group of five young men from 25 to 29 years of age and two groups of older men, six between 58 and 70 years and eight between 74 and 85 years of age were chosen for the study. They performed four different total amounts of work (135-500 Kg.M.) at a fixed rate (450 Kg.M./min) and a fixed total amount of work (500 Kg.M.) at three different work rates (135-450 Kg.M./min). All experiments were carried out on a manual bicycle ergometer operated when the patient was recumbent. Ventilation volume, carbon dioxide elimination, and oxygen uptake were estimated for small blocks of expired gas (10 L. and 40 L.) during exercise, a pre-exercise basal period, and a forty minute recovery period.

Estimates of the maximum responses for ventilation volume, CO_2 uptake and O_2 uptake indicated that: (1) older subjects attained higher levels of ventilation than did the young; (2) at the higher levels of work the older subjects showed an impairment of oxygen uptake which was not associated with any impairment of carbon dioxide elimination.

Estimates of total excess responses measured for excess ventilation volume, oxygen uptake and carbon dioxide elimination indicated that: (1) older subjects ventilate more air per unit of work done or oxygen utilized than do the young; (2) at high and low rates of work the older subjects require more oxygen for a given amount of work than do the young.

It was suggested that the observed inability of the older subjects to work at higher levels of work than those indicated was associated with the impaired oxygen uptake.

The reduced mechanical efficiencies found in the older subjects were attributed primarily to the failure of the older man to coordinate his movements as well as the young.

A Detailed Study of the Electric Potentials Recorded over Some Postural Muscles While Relaxed and Standing.

J. Joseph, A. Nightingale and P. L. Williams, J. PHYSIOL., 127:617-625, March 1955.

Many investigators have reported that potentials cannot be recorded from relaxed limb muscles and from some of the muscles of the leg and thigh in the upright position. It appears that these workers were mainly concerned with the form, frequency, and amplitude of the potentials accompanying various grades of voluntary or reflex contraction. Careful study of their recordings show that the order of amplification, together with the level of amplifier noise that was present in their recording apparatus, would prevent the demonstration of low amplitude potentials if these had been present.

In this study, apparatus with a low noise level, a very high amplification and a carefully chosen range of frequencies was used. By means of this equipment with a noise level producing potentials of two microvolts occurring on the average 300-400/sec., it can be shown that potentials of about five microvolts peak to peak, occurring 40-50/sec., can be picked up over relaxed muscles in the lower limb and over bony prominences. Muscles studied include the soleus, gastrocnemius, tibialis anterior, quadriceps femoris and hamstrings. The tibia and patella were the bony prominences studied. These potentials were not regarded as being due to motor unit activity because contraction of the fibers of one or more motor units would have produced more marked potentials. These electrical fluctuations may be due to "miniature endplate potentials," to the irregular flow of ions through vessels, to the thermal agitation of electrons and ions giving rise to phenomena similar to the "thermal noise" in resistors. No conclusions can be made as to the responsibility of any of these sources until a further investigation is made.

In the stand-at-ease position previous findings have been confirmed; namely, that the calf muscles are continually contracted, but the tibialis anterior and the front and back thigh mucles do not show postural activity. The activity of the calf muscles can be expected since the line of body weight falls in front of the ankle joints.

Bilateral Lumbar Plexus Lesions Simulating Cauda-Equina Compression.

A. R. Taylor and N. M. Dott, LANCET, 1: (No. 6866), 688-691, April 2, 1955.

A tubercular lesion of the lumbar vertebrae most commonly spreads posteriorly and compresses the spinal cord or cauda equina. Less frequently, the lesion spreads laterally into the substance of the psoas muscle. In either case, paraplegia or paraparesis results.

Four cases are presented in this paper in which the tubercular lesion extended laterally into both psoas muscles. The lesion caused an increased pressure in the psoas compartment on the outflowing nerves of the lumbar plexus. The extraspinal lesions usually differ from the spinal cord lesions in that: (1) there is asymmetric bilateral neurological involvement, (2) the sacral roots are not involved, and (3) there is no interference of central spinal fluid conduction. If it is thought that the paralysis is caused by the compression of the lumbar plexus, attempts should be made to relieve the pressure by closed or open drainage of the psoas compartment.

Review File

Have you been searching for a holder for your current issues of the *Physical Therapy Review?* If you have, you will be interested in the Jesse Jones Volume File. It will keep your journals in a compact file case on your desk for quick reference. (Order blank on page 410 of this issue)

Book Reviews . . . . .

Peripheral Nerve Injuries. Principles of Diagnosis. *By Webb Haymaker, M.D. Chief Neuropathology Section, Armed Forces Institute of Pathology, Washington, D.C.; and Barnes Woodhall, M.D., Professor of Neurosurgery, Duke University School of Medicine, Durham, North Carolina. Cloth; price $7.00. Pp. 333; illus. W. B. Saunders Co., Philadelphia, 1953.*

Peripheral Nerve Injuries has been written primarily for physicians and medical students but its material is such that it would serve well as a reference book for physical therapists. Its keynote is the early recognition of the total components of peripheral nerve injuries thus shortening rehabilitation time. And towards this aim the authors have contributed their extensive experience in such injuries, service connected, in a thorough, correlated presentation from principles of innervation, examination of patient, to clinicopathological classification, causes, and general symptomology. Not only do they draw from their own experience but also from that of others giving the concurrence or divergence of results and their interpretations. So the attempt has been made to afford clearly and concisely a single source for the physiology, pathology, and classification of peripheral nerve injuries.

The book is divided into four sections: (1) An Analysis of the Segmental and the Peripheral Nerve Supply of the Skin, Muscles, and Skeleton; (2) Examination of the Peripheral Nervous System; (3) Classification, Causes, and Symptomology of Peripheral Nerve Injuries; (4) Injuries of Plexuses and Peripheral Nerves. Each section is preceded by a brief introduction highlighting the chapters to follow. This second edition is essentially like that of the first (1945) with improvement in format, more illustrations, and the additions of three chapters discussing the causes and manifestations of peripheral nerve injuries, the various degrees, and their clinical significance. It elaborates further on the tests employed in diagnosis and prognosis such as galvanitetanus ratio, dermometry, electromyography, Hoffmann-Tinel's Sign etc. These additions contribute materially to the understanding of treatment responses and expected results. The section on muscle evaluation is not as definitive as that to which physical therapists are accustomed. Nevertheless, it is worthwhile reading not so much for the positions given but for the trick movements which are easier to see in localized lesions, and an understanding of which can be carried over to more complicated patterns of involvement.

Complementing the monograph are numerous diagrams and photographs assembled mainly from the Armed Forces Institute of Pathology during World War II and the Korean War. These are excellent, well selected, depicting the localization of motor, sensory, vasomotor dysfunction, and resulting deformities which again are not as easy to single out in other neuromuscular conditions.

The subject of treatment as it concerns the physical therapist is not discussed but certainly the understanding of the physiology and pathology as it is presented gives the rationale for such. The book presents a good, clear review of all the ramifications of peripheral nerve injuries bringing this subject up to date with the experience of the authors and others since the publication of the first edition.

Rehabilitation Monograph VIII: A Manual For Training The Disabled Homemaker. *By Howard A. Rusk, M.D., Edith L. Kristeller, M.D., Julia S. Judson, M.S., Gladys M. Hunt, R.N., and Muriel E. Zimmerman, O.T.R. Paper; price $2.00. Pp. 167; illus. Institute of Physical Medicine and Rehabilitation, New York, 1955.*

This 167-page monograph is directed particularly to those engaged in setting up and carrying out programs for the retraining of the disabled homemaker, but it will be of value also to all the groups participating in such an enterprise.

The manual presents the general principles underlying the institution of a successful teaching program, with suggestions as to personnel, organization, and administration, sources of funds, and services.

For the sake of those who may be qualified to teach homemaking but have no medical background, a chapter on the common disabilities is included.

The principles of work simplification are well presented and will be of interest to the normal as well as to the disabled person. Suggestions for the solution of some of the homemaking problems of the disabled woman are many and detailed and are, for the most part, practical. In addition to suggestions for work planning and the actual performance of certain tasks, there are many suggestions as to choice of home equipment, arrangement of rooms, house plans, storage space, and special adaptations of equipment. The problems of both upper and lower extremity disabilities are treated.

The manual will be of definite interest to physical therapists and to those teaching physical therapy students.

The Human Organism. *By Russell Myles De Coursey, Ph.D., Professor of Zoology, University of Connecticut. Cloth; price $5.75. Pp. 550; illus. 275. McGraw-Hill Book Co., Inc., New York, 1955.*

This is primarily a simplified physiology text with just enough basic anatomy given to help understand the various physiological principles.

Beginning with the somatic cell, the text works through muscle and nerve physiology and on to the various body systems. The brain and autonomic system, usually difficult subjects, are clearly presented in a fundamental fashion which should not leave the student confused. There is an excellent section on the endocrine system with good discussion covering hormones. Quite naturally, the two following chapters are concerned with human development and the reproductive system.

The structure of this book is unusually good. An organ is described along with the physiology of its prime system. This integration makes for better over-all understanding. One chapter leads easily into the following chapter.

The illustrations are of a basic nature; simple, but effective. At the end of each chapter there is a list of discussion questions and a list of references. This is a good text for college students who do not plan to seek a technical or medical career. If there were time in the college curriculum, this text would serve well in a lower division, prephysiology course for physical therapy students.

Die orthopaedische Behandlung der spinalen Kinderlaehmung. *By Professor Dr. Franz Schede, Chief of the Orthopaedic Clinic Landeskrankenhaus Sanderbusch, Oldenburg, Germany. Introduced by Dr. Berthold Borschel, Chief of Neurological Service, Landeskrankenhaus Sanderbusch. Paper binding; price 4.50 mks. Pp. 63; illus. Richard Pflaum Verlag, Munchen, 1954.* (Translated and reviewed by Susan Kaufman.)

This manual deals with the orthopedic treatment of anterior spinal poliomyelitis and directs itself to the German kinesitherapist ("Krankengymnast"). It is introduced by Dr. Berthold Borschel, Chief of the Neurological Service at the Landeskrankenhaus (county hospital) Sanderbusch in Oldenburg, Germany, with a chapter on the history, epidemiology, pathology, symptomatology, prophylaxis, and treatment of anterior poliomyelitis, which essentially parallels the material published on these subjects in this country.

Dr. Schede, Chief of the Orthopedic Clinic of the same hospital, concerns himself with therapy only. He stresses the concept of teamwork of the internist, orthopedist, and "krankengymnast"; the task of the former being the treatment of the disease itself, the task of the latter two the treatment of the sequelae (paralysis, contractures, deformities). Dr. Schede feels strongly that, if during the first weeks there are severe pains in back and extremities or signs of meningeal irritation and infection in the spinal cord like nuchal rigidity, pain following exercises, fever, or Lasègue's sign (but not Lasègue's sign alone), only complete rest and positioning, so as to afford maximal relaxation, are indicated. In cases of extreme pain and restlessness a plaster cast is recommended. Stretching should not be carried beyond the point of pain but rather be maintained below the point of pain over a long period of time—preferably by apparatus. Such apparatus is illustrated, i.e. an airplane splint, a drop foot splint and a "mobilization brace" to correct a knee flexion contracture acting on the principle of the wedge cast. One good point—generally known but all too often forgotten—was brought out in this connection. In order to prevent a subluxation of the tibia posteriorly, traction should be applied to the tibia in the line of deformity, until the joint space is 1 cm. to 2 cm. wide, and only then should the contracture be corrected by stretching.

Dr. Schede expresses his regret at the general lack of a systematic, consistent exercise program for polio patients. Most patients state that they have received only massage and electrical stimulation. He feels that electric stimulation should be given until voluntary muscle contractions can be observed, but active exercise should be the treatment of choice thereafter. There is no mention made of passive motion or any other kind of muscle stimulation other than electric. A distinction is made between the aimed exercise, i.e. aimed at isolated muscles, and the general exercise like swimming, walking in the pool, and free play on the mat. Dr. Schede considers this latter type of exercise essential because it greatly motivates movement and improves the circulation but above all because of the physical and mental recreation it offers. Like so many he stresses short, frequent, and intensive exercise periods made possible by self-exercising. The methods recommended are essentially the same as the ones used in this country. Various exercises are illustrated and one for trunk flexion using counterweights seems both practical and effective.

There are a few paragraphs on elementary problems of kinesiology and bracing. Among others the author describes a brace indicated when the gluteus maximus is paralyzed and the tensor fasciae latae contracted. It accommodates a hip flexion contracture and consists of a shell around the lower extremity that places the knee in the same angle of flexion as the hip. The ankle is held in a neutral position, and the foot is not contained in the shell but covered with a "light sandal." The resulting shortening of that extremity is compensated by a walking iron that extends vertically upward to meet the thigh piece of the brace so that walking iron, thigh piece, and lower leg form a triangle. As far as can be ascertained the brace is ischial weight bearing, and the weight is mainly transferred through the walking iron. This seems to be a cumbersome brace, which certainly does not stress physiological alignment, and it is not quite clear how the patient is able to sit comfortably or bend his knee when sitting. But Dr. Schede prefers this brace to a pelvic or trunk brace locked to a thigh piece of a brace (probably corresponding to our Knight Spinal—long leg brace and hip lock).

The maintenance of a good circulation in the paralyzed muscles is of great importance to Dr. Schede. He suggests warm baths, mud packs, paraffin baths, wet packs, and massage to accomplish this end. Both authors express their amazement at the acclaim Sister Kenny won in this country for propagating a well-known fact. The authors apparently overlook the fact that Sister Kenny's concept of treatment was not confined to hot packs. It is therefore not surprising that a phenomenon like spasm is not mentioned in this manual or are such fundamental procedures discussed as positioning, early mobilization of the extremities, muscle stimulation via the proprioceptive pathways, and the development of a normal gait pattern. Generally speaking then, Dr. Schede's approach to the orthopedic treatment of anterior spinal poliomyelitis is more static and less functional and physiological than it is in this country. There are some good suggestions and good points stressed, but as it concerns the orthopedic treatment of anterior spinal poliomyelitis per se, this manual contributes little and in some aspects is somewhat outdated.

You and Your Retarded Child. *By Dr. Samuel A. Kirk, Director of the Institute for Research on Exceptional Children, University of Illinois; Dr. Merle B. Karnes, Director of Special Education of the Champaign, Illinois Public School System; and Winifred D. Kirk, Psychologist and Clinical Teacher in Urbana, Illinois. Cloth; price $4.00; Pp. 184. The Macmillan Company, New York, 1955.*

The authors attack a most difficult problem in a realistic, forthright manner. The book is fairly easy to read and even the layman should not have too much difficulty in comprehending it.

The problem of the severely retarded child is one that has come to the forefront in the past seven or eight years with a great deal of publicity, emotionalism, and information both true and false. The information contained in *You and Your Retarded Child* is pertinent, accurate, and makes no attempt to gloss over or explain away the problems involved but rather attacks them in a realistic manner providing the reader with the necessary background and information to arrive at

some rather practical solutions. Sections are devoted to aiding the child at the various developmental levels which should prove to be of invaluable assistance to the parents and other persons responsible for the care and training of these children.

Chapter three, which provides parents with a rating scale for evaluating the intelligence of their child, should be of particular value. The reviewer was also impressed with the final chapter describing a total program for the retarded. Here the authors recognize that any agency or agencies that assume or are given the responsibility for providing a program for the severely retarded must extend their services and responsibilities beyond the "school years." The problem of the severely retarded is one that has tremendous impact upon the parents, siblings, and society in which he is born and lives and is not solved by a school program for a restricted number of years. The program as outlined in the book recognizes this and extends the services throughout the entire life of the person.

The Appendix, listing public and private schools and homes, should also prove to be of great value to parents and clinicians faced with the problem of providing recommendations or making arrangements for the care and treatment of severely retarded children.

Basic Concepts in Community Planning for the Cerebral Palsied. *By Morris Klapper, Executive Director, United Cerebral Palsy Associations of New York State, Inc. Paper; price free. Pp. 44. United Cerebral Palsy Association of New York State, Inc. New York, 1954.*

The author, Executive Director of United Cerebral Palsy of New York City, analyzes methods of approaching problems in the field of cerebral palsy. The author first deals with the essential direct services available for cerebral palsy treatment describing the structure and function of various treatment centers. The importance of educational and recreational facilities, vocational guidance, training, and placement are briefly discussed.

The author next describes the essential indirect services which include research, public relations, stimulation of legislative action, and fund raising. This section views the existing services and the need for additional funds, education of the public and professional groups, and research. Suggestions are given concerning how some of these things might be accomplished.

The final section is devoted to concepts for effective administration. The author states the need for voluntary health agencies to establish a fundamental philosophy of operation and of purpose, and outlines the growth and structure of the United Cerebral Palsy of New York City.

The booklet, of 44 pages, is well outlined and includes a bibliography. Nontechnical language is used but an occasional involved sentence appears. The booklet would be helpful to those engaging in the establishment of cerebral palsy programs and of interest to those dealing with cerebral palsy treatment programs.

The reviews here published have been prepared by competent authorities and do not represent the opinions of the American Physical Therapy Association.

Our Book Reviewers for August

Margaret Bryce, Instructor in Physical Medicine, Course in Physical Therapy, Medical School, University of Wisconsin, Madison.

Jean Cuthbertson, Teaching Assistant, Curriculum in Physical Therapy, University of Michigan. Ann Arbor.

Carmella A. Gonnella, Assistant Technical Director, Division of Physical Therapy, University of Texas Medical Branch, Galveston.

G. Orville Johnson, Associate Professor, Syracuse University, School of Education, Education for Exceptional Children, Syracuse, New York.

B. Lee Katz, Physical Therapist in Private Practice, Los Angeles.

Susan Kaufman, Chief Physical Therapist, Children's Rehabilitation Center at Bird S. Coler, Welfare Island, New York.

Dues Notice

Annual dues were payable on May 1st. Your prompt response will be appreciated. The Bylaws require that members whose dues have not been received by August 1st shall be suspended from membership.

May we also call to your attention that according to the Bylaws "any active member not actively employed in physical therapy may, on application to the Board of Directors and on approval thereof by the Board, be made an inactive member."

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IMMEDIATE PLACEMENT for qualified therapists in 140-bed rehabilitation center of all age levels; treating postacute and convalescent polio; orthopedic, neuromuscular and musculoskeletal disorders. Good opportunity for initiative. Congenial working conditions with cooperative staff. Excellent facilities; therapeutic indoor and outdoor pools. P.T. and O.T. Clinical training center gives opportunity for teaching and supervision to those interested. Also, for Assistant Chief to help plan and build program for Graduate School Department medically supervised by American Board Physiatrist. Five-day week with paid vacation. Laundry furnished. Write: Medical Director, Dr. Odon F. von Werssowetz, Warm Springs Foundation, Gonzales, Texas.

WANTED: A QUALIFIED STAFF physical therapist, female, for well equipped department in a modern 275-bed general hospital with outpatient service; paid vacation; sick leave; 6 holidays; salary open. Apply Robert M. Murphy, Administrator, Lima Memorial Hospital, Linden and Mobel Streets, Lima, Ohio.

PHYSICAL THERAPIST: In hospital-school for rehabilitation of children with orthopedic handicaps. Complete interesting program. Good salary, merit increases. Annual paid vacation, sick leave, excellent retirement plan. Write Vera E. Dennis, Director of Physical Therapy, Illinois Children's Hospital-School, 2551 N. Clark, Chicago 14, Ill.

POSITION: Physical therapist for new cerebral palsy center. If person has had sufficient experience, directorship will be open also. Apply to Mrs. Thomas Owen, Amarillo Cerebral Palsy Center, Amarillo, Texas.

PHYSICAL THERAPIST with at least 2 years experience required by a Voluntary Public Health Visiting Nursing Organization. For further information apply District Director, Victorian Order of Nurses, 1246 Bishop Street, Montreal, Canada.

WANTED: ASSISTANT THERAPIST. Good opportunity for recent graduate. Fully equipped department. Living quarters available. Two weeks vacation. Building program. Write Personnel Director, Memorial Hospital, Casper, Wyoming.

IOWA METHODIST HOSPITAL, Des Moines, Iowa, needs qualified physical therapist. Hospital has 400 beds, including 100-bed Raymond Blank Memorial for Children. Postpolio cases and in- and outpatient work. Competent professional staff and assistants, excellent working relationships. Apply: Bruce D. Root, Personnel, Director.

Washington Elk's MOBILE PHYSICAL THERAPY PROGRAM needs 2 qualified therapists to work with cerebral palsied and other orthopedic conditions. Home and center therapy with parent instruction. Restricted area of travel. Station wagon and expenses allowed when traveling. Excellent salary, paid holidays, sick leave, 2 weeks' paid vacation and other benefits. Contact H. Norman Hommas, Physical Therapy Supervisor, 121 East 23rd Avenue, Olympia, Washington.

QUALIFIED PHYSICAL THERAPIST needed for staff position in children's orthopedic hospital. State registration required. Good salary, maintenance optional; 15 days' vacation; 15 days' sick leave, 40-hour week. Contact Dr. W. L. Minear, Chief Surgeon, Carrie Tingley Hospital for Crippled Children, Truth or Consequences, New Mexico.

PERMANENT STAFF POSITION FOR PHYSICAL THERAPIST. Graduate of accredited school, good starting salary with regular increases; to work with children up to 21 years of age. Forty-hour week, vacation with pay, sick leave, etc. 100-bed-orthopedic hospital; new modern equipment. Write to Miss Anna B. Quinn, R.N., Administrator, Kosair Crippled Children Hospital, 982 Eastern Parkway, Louisville 17, Kentucky.

PHYSICAL THERAPIST for active, well equipped department in teaching hospital affiliated with Northwestern University. Located in pleasant residential suburb Lake Michigan. Forty-hour week. Good salary. Apply: Personnel Director, Evanston Hospital, Evanston, Illinois.

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PHYSICAL THERAPISTS for physically handicapped children needed in California state institutions and public schools. Must have one year of supervised experience following graduation from recognized school of physical therapy. Mail application before October 6 for nationwide civil service examination. Apply State Personnel Board, 801 Capitol Avenue, Sacramento 14, Calif.

PHYSICAL THERAPISTS, MALE OR FEMALE, full or part-time, for rapidly expanding rehabilitation center. Adults' and children's program. Liberal salary and holidays; one month's vacation. Write Mr. Breuer, R.P.T., Bird S. Coler Hospital, Dept. of Rehabilitation, Welfare Island, New York.

Classified WANT-ADS

PHYSICAL THERAPIST WANTED, in charge of dept. for cerebral palsy center in Cedar Rapids, Iowa. Aircondit. bldg. Good salary, paid vacation. Address replies to Box 42, care of the Physical Therapy Review, 1790 Broadway, New York 19, N. Y.

PHYSICAL THERAPIST, FEMALE, to complete staff in small private clinic serving orthopedic surgeons and physicians in growing community. Contact Philip Riddleberger, Director, The Physical Therapy Center of Sacramento, 2220 J Street, Sacramento 16, California.

STAFF THERAPIST: Attractive position which offers opportunity for participation in a program of comprehensive rehabilitation. Full accreditation; 70-bed orthopaedic hospital. Apply Miss Betty O. Nichols, Supervisor, Physical Therapy and Rehabilitation, Sunny View Hospital, 124 Rosa Road, Schenectady, N. Y.

QUALIFIED PHYSICAL THERAPIST needed immediately to assist a progressive public health nursing agency in planning, directing and organizing physical therapy services to patients in their homes and to coordinate such services in the community. This is a real challenge for the right person. Excellent employment practices. Salary open. Write Helen E. Hestad, Director, V.N.A., 1201 South 42, Omaha 5, Nebr.

PHYSICAL THERAPIST NEEDED for 185-bed gen. hospital. Excellent new facilities and equipment; 40-hr. week, vacation and sick benefits. Good salary. Apply Personnel Office, Blessing Hospital, Quincy, Ill.

EXPERIENCED THERAPIST WANTED to operate Physical Medicine Department in new medical center for adults located in the center of Chicago. Beautiful new department with all new equipment. Salary open. Excellent working conditions. Contact Rosamond M. Yost, 333 S. Ashland Blvd., Chicago, Illinois.

WANTED: TWO QUALIFIED physical therapists for large well equipped P.M.R. Department in 700-bed hospital. Good salary, vacation and retirement benefits. Apply H. J. Bearzy, M.D., Miami Valley Hospital, Dayton 9, Ohio.

WANTED IMMEDIATELY: QUALIFIED PHYSICAL THERAPIST for general physical medicine, rehabilitation in outpatient center. Five-day week, 3 weeks' paid vacation, 6 holidays, sick leave, social security. Salary dependent upon experience. Write: Gloria J. Fitzpatrick, RPT, Director, Ingham County Curative Workshop, 615 North Capitol, Lansing, Michigan.

WANTED: PHYSICAL THERAPIST to take over new department that grew from part time to full time operation in two months. Beautiful spacious quarters with all new equipment in 150-bed hospital located in friendly Indiana community close to Chicago. Salary open. Write to Mr. Malasto. Admin., Porter Memorial Hospital, Valparaiso, Ind.

WANTED: PHYSICAL THERAPIST. Five-day, 40-hour work week, social security, sick benefits, paid vacation, salary good. Apply Director, Oak Ridge Hospital, Oak Ridge, Tennessee.

WANTED: PHYSICAL THERAPIST for children's convalescent home. Good salary and working conditions with annual increment. Five-day, 35-hour week. Completely equipped department. For details write Superintendent, Betty Bacharach Home, Longport, N. J. (Atlantic City).

QUALIFIED PHYSICAL THERAPIST wanted for 400-bed county hospital. Well equipped, expanding department for treatment of all types of cases, service for inpatients and outpatients, with extensive polio program. Excellent salary based on step-plan, 40-hour week, 3 weeks' vacation, retirement plan, all legal holidays, and sick leave. Staff of 3 qualified therapists, and sufficient aide assistance. For further information write: Wesley W. Hall, Stanislaus County Hospital, 830 Scenic Drive, Modesto, California.

PHYSICAL THERAPIST for well equipped outpatient center established 1950, offering nursery school, speech, occupational and physical therapy to cerebral palsied children. Salary dependent upon experience. Regular increments. Five-day week, four-week summer vacation, nine-day Christmas holiday. Employees covered by Social Security. To replace therapist leaving in July and can hire immediately if available. Write Miss Virginia Pettit, Director, United Cerebral Palsy of Cincinnati, 3601 Victory Parkway, Cincinnati 29, Ohio.

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